Fig.1

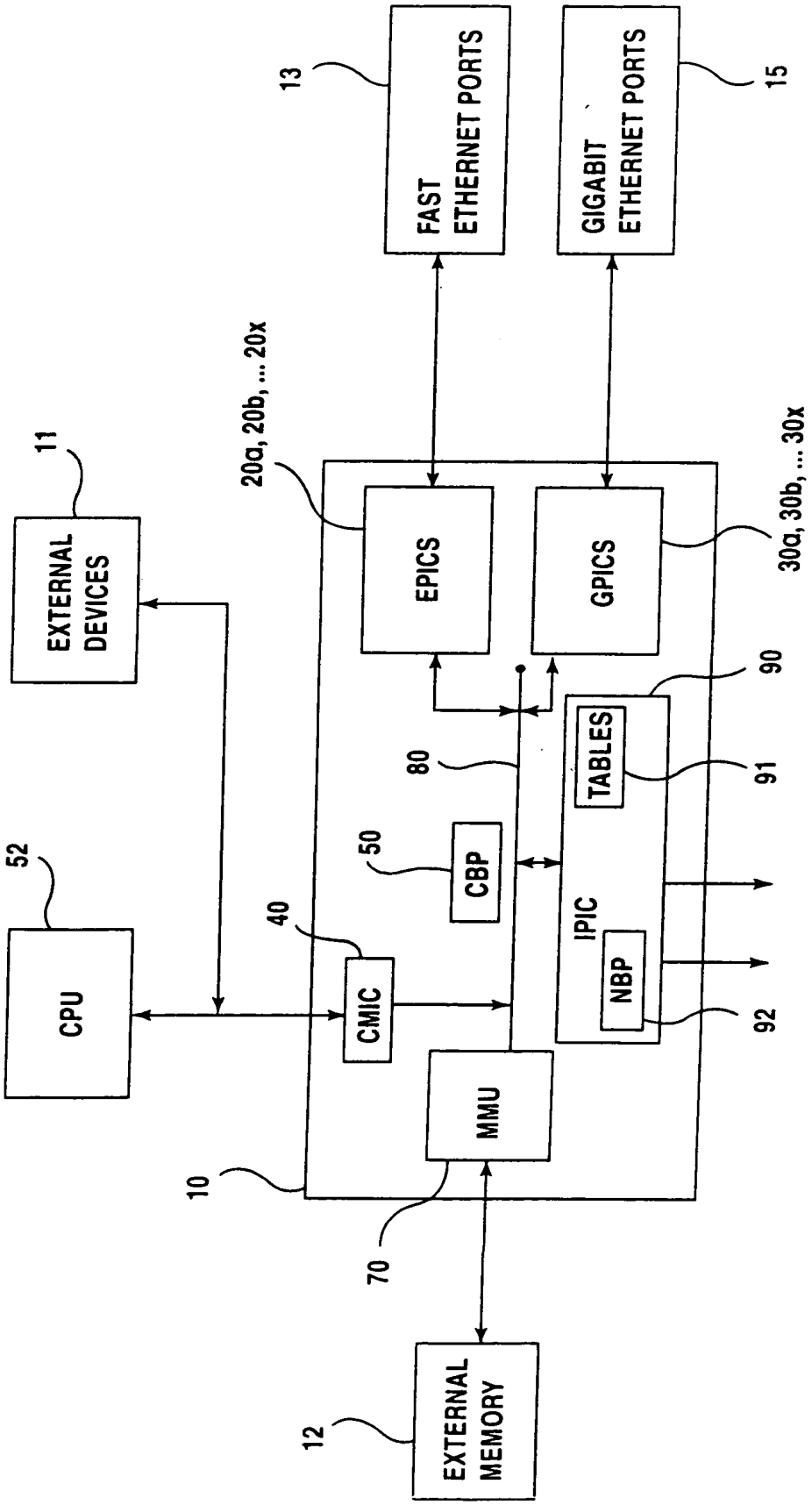


Fig.2

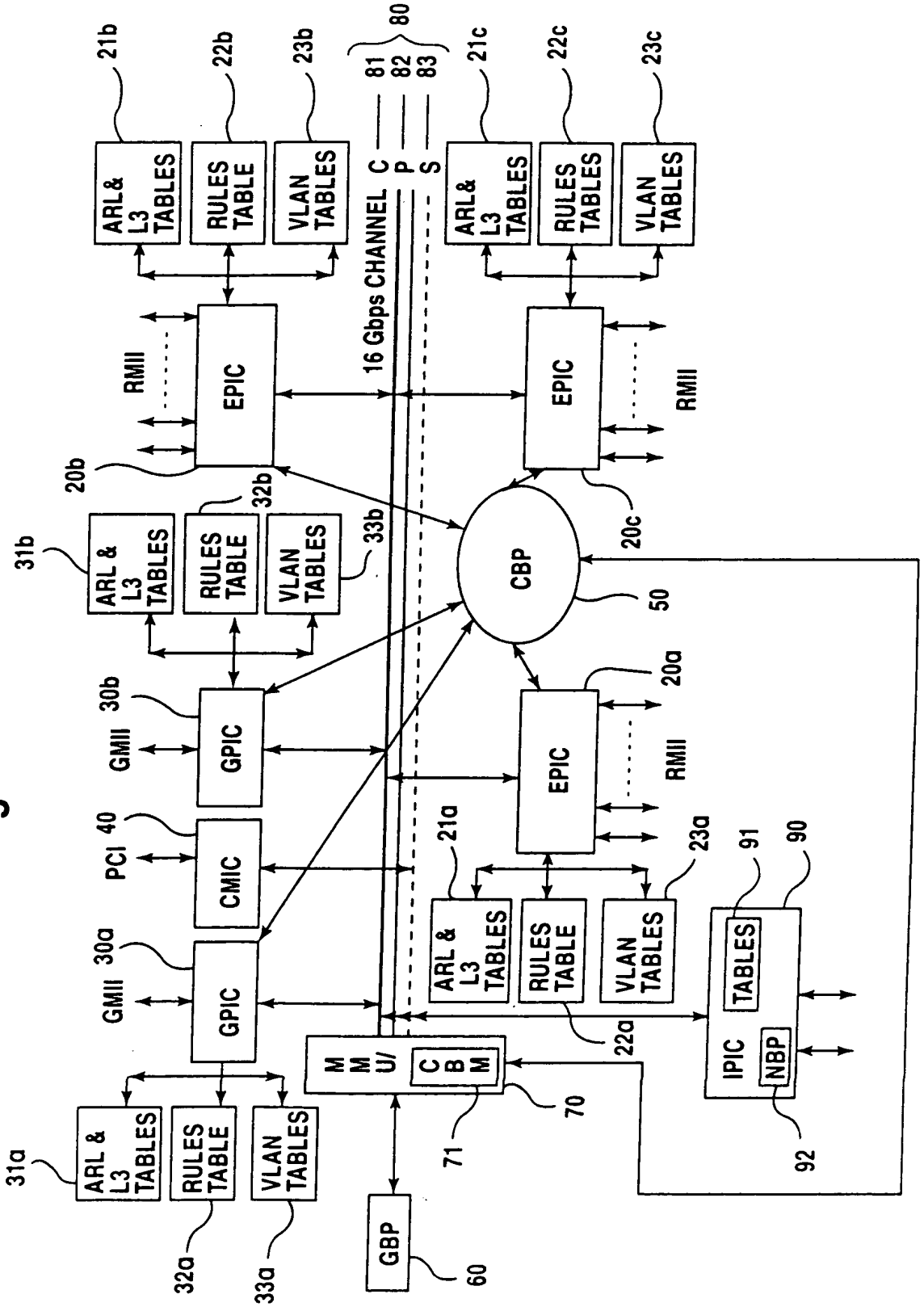
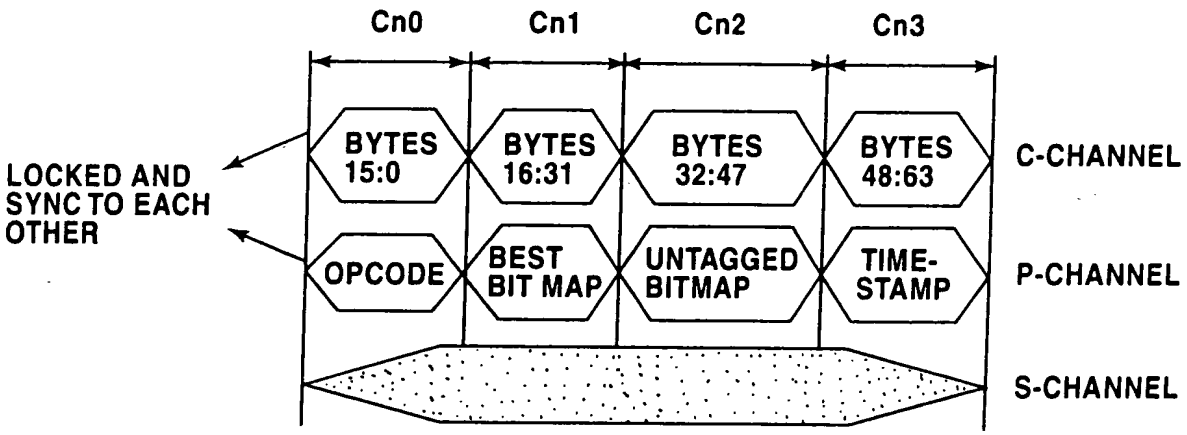

16 Gbps CHANNEL
C
P
S
80
81
82
83
ARL& L3 TABLES
RULES TABLE
VLAN TABLES
EPIC
RMII
GMII
GPIC
PCI
CMIC
MMU/CBM
IPIC
TABLES
NBP
CBP
GBP
20a
20b
20c
21a
21b
21c
22a
22b
22c
23a
23b
23c
30a
30b
31a
31b
32a
32b
33a
33b
40
50
60
70
71
90
91
92

Fig.3


Cn0
Cn1
Cn2
Cn3
LOCKED AND SYNC TO EACH OTHER
BYTES 15:0
BYTES 16:31
BYTES 32:47
BYTES 48:63
C-CHANNEL
OPCODE
BEST BIT MAP
UNTAGGED BITMAP
TIME-STAMP
P-CHANNEL
S-CHANNEL

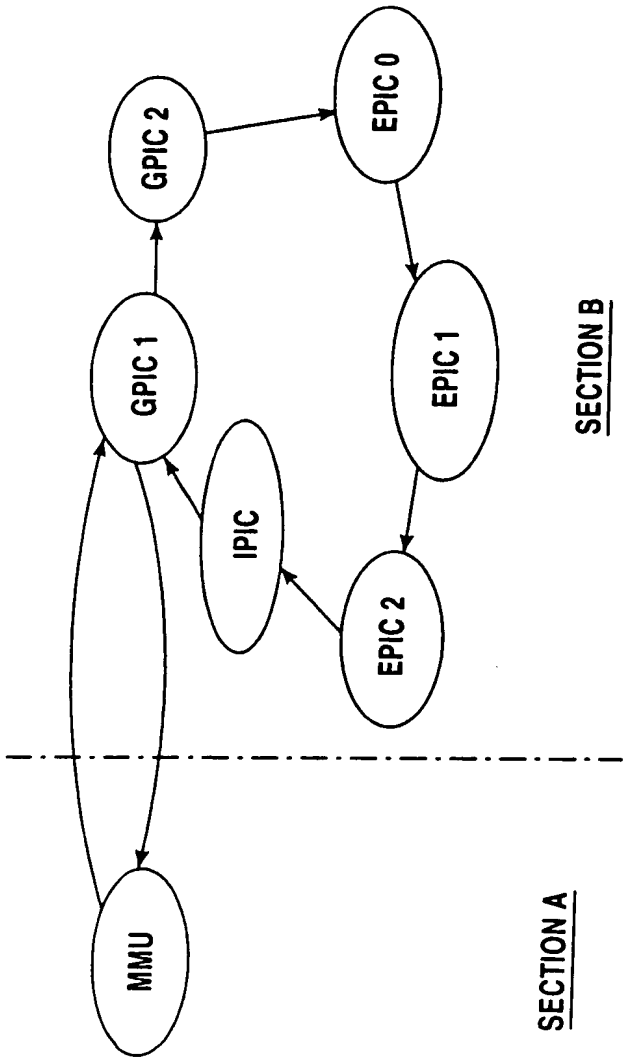

GPIC 2
EPIC 0
GPIC 1
EPIC 1
IPIC
EPIC 2
MMU
SECTION A
SECTION B

Fig.4a

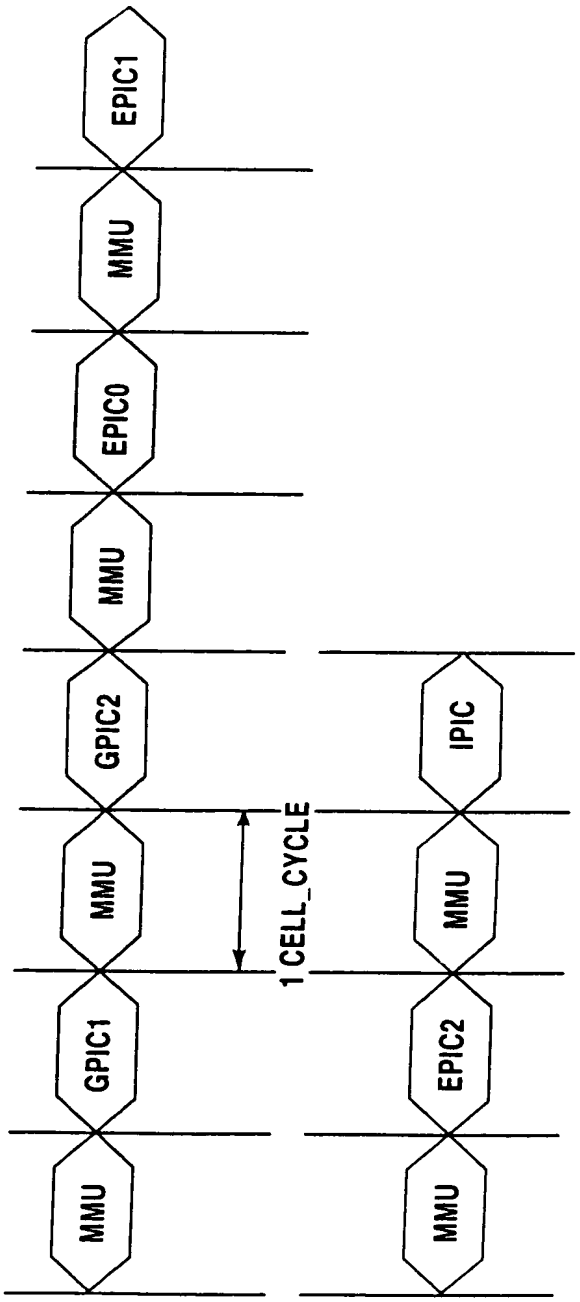

EPIC1
MMU
EPIC0
MMU
GPIC2
IPIC
MMU
MMU
1 CELL_CYCLE
GPIC1
EPIC2
MMU
MMU

Fig.4b

Fig.5

PROTOCOL CHANNEL MESSAGES

30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0
OPCODE	IP IPX	RESERVED	NXT CELL	SRC DEST PORT			COS	J	S	E	CRC	P	O	LEN	

62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32
MODULE ID BITMAP															

30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0
R	Bc / Mc PORTBITMAP														

62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32
PFM	NEW IP CHECKSUM								M	MT-MOD ID		T	TGID	MOD OPCODE	c

30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0
U	UNTAGGED PORTBITMAP / SRC PORT NUMBER (bit0...5)														

62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32
RSVD		MATCHED FILTER		VLAN ID						SRC PORT			REMOTE PORT		

30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0
CPU OPCODES									TIME STAMP						

62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32
R	L3 PORT BITMAP														

Fig.6

SIDE BAND CHANNEL MESSAGES

30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0
OPCODE			DEST PORT / DESTINATION DEV ID			SRC PORT			DATA LEN			E	EC ODE	COS	C
ADDRESS															
DATA															

Fig.7
PRIOR ART

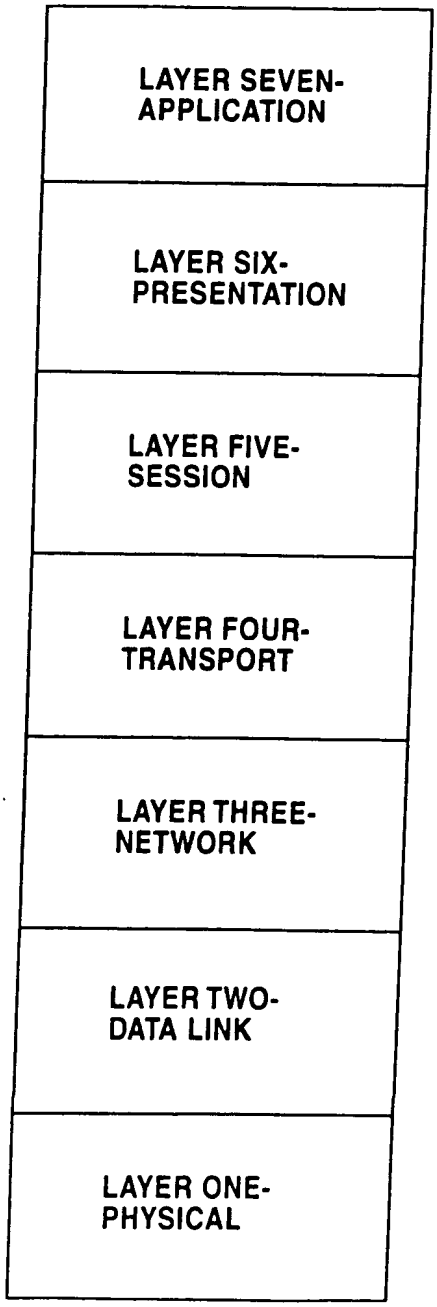


Fig.8

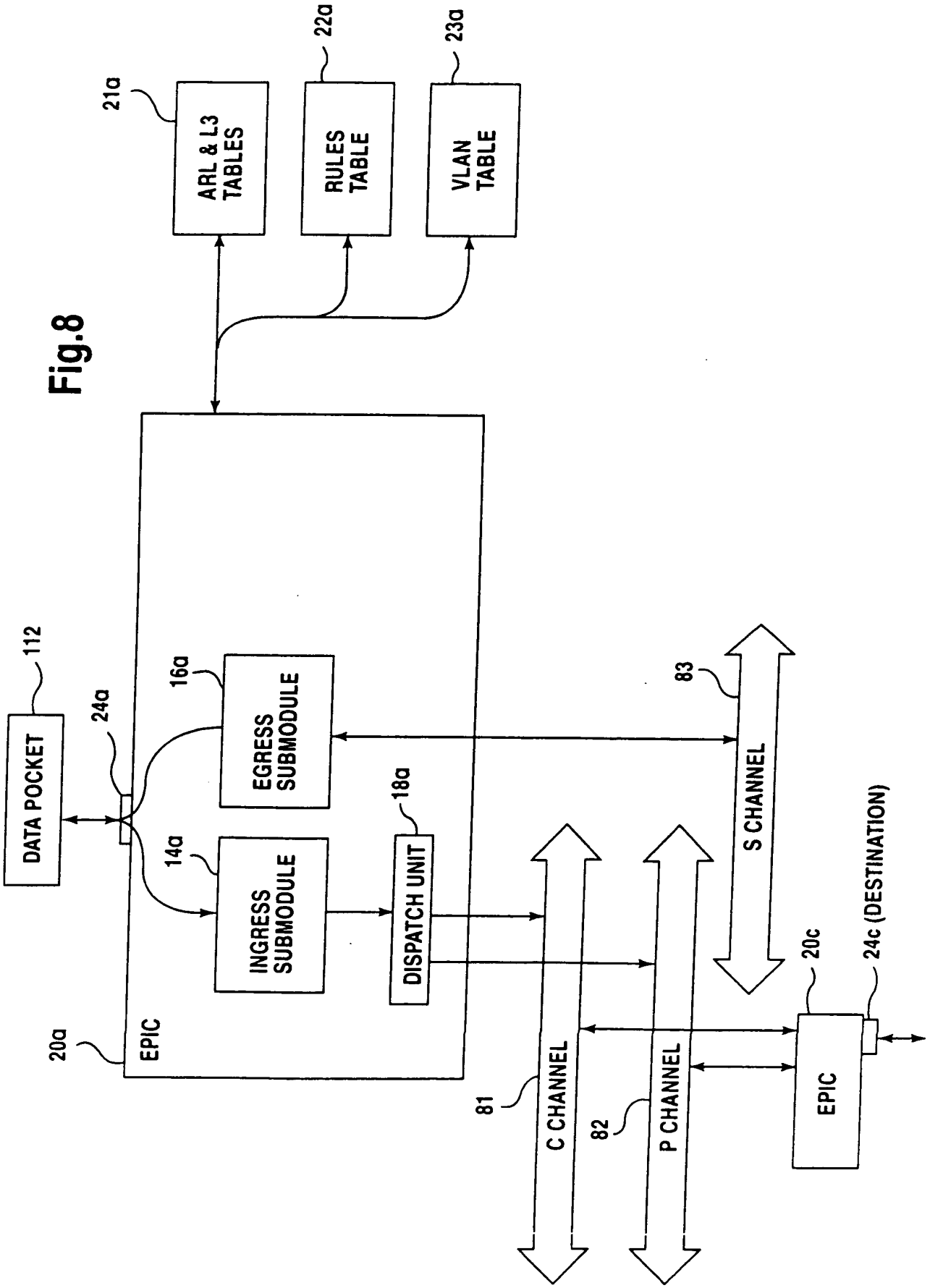

21a
ARL & L3 TABLES
22a
RULES TABLE
23a
VLAN TABLE
112
DATA POCKET
24a
16a
EGRESS SUBMODULE
14a
INGRESS SUBMODULE
18a
DISPATCH UNIT
20a
EPIC
83
S CHANNEL
81
C CHANNEL
82
P CHANNEL
20c
EPIC
24c (DESTINATION)

Fig.9

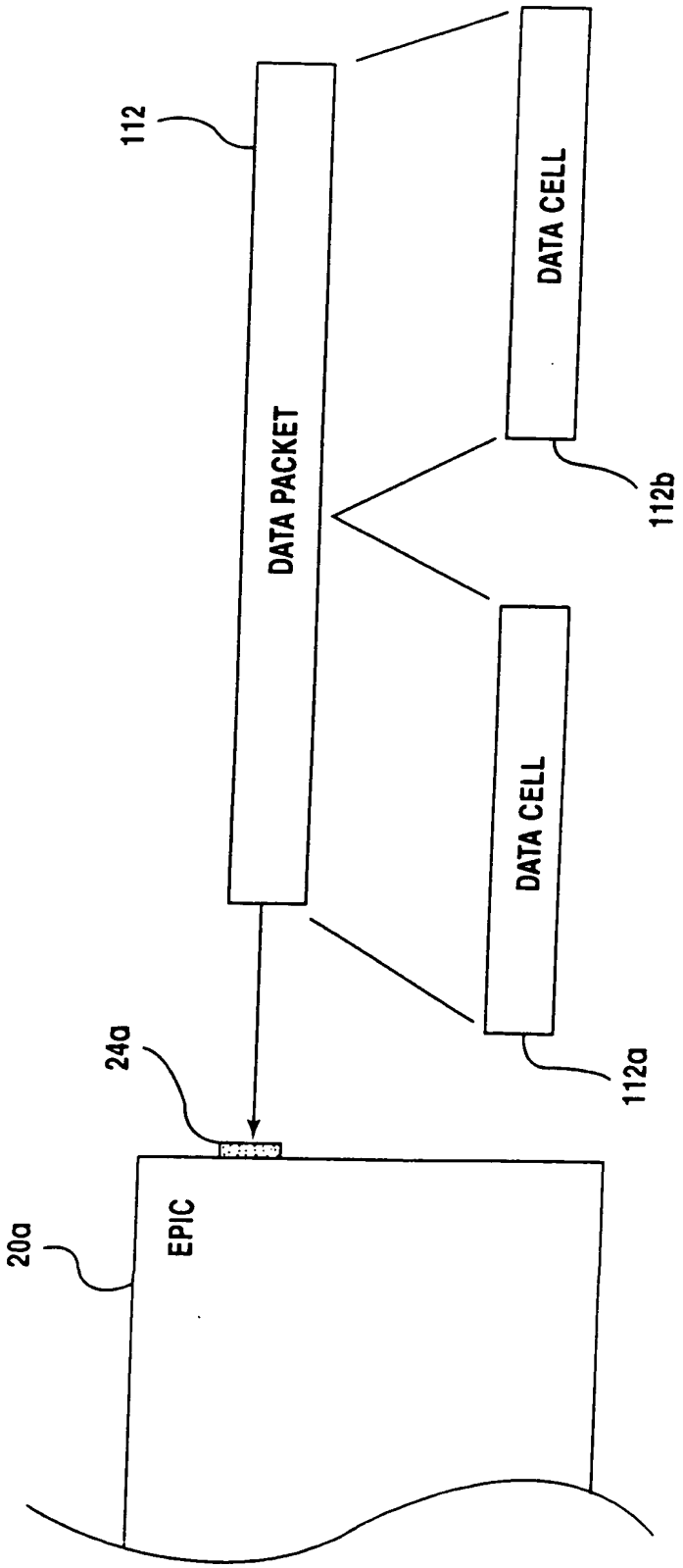


Fig.10

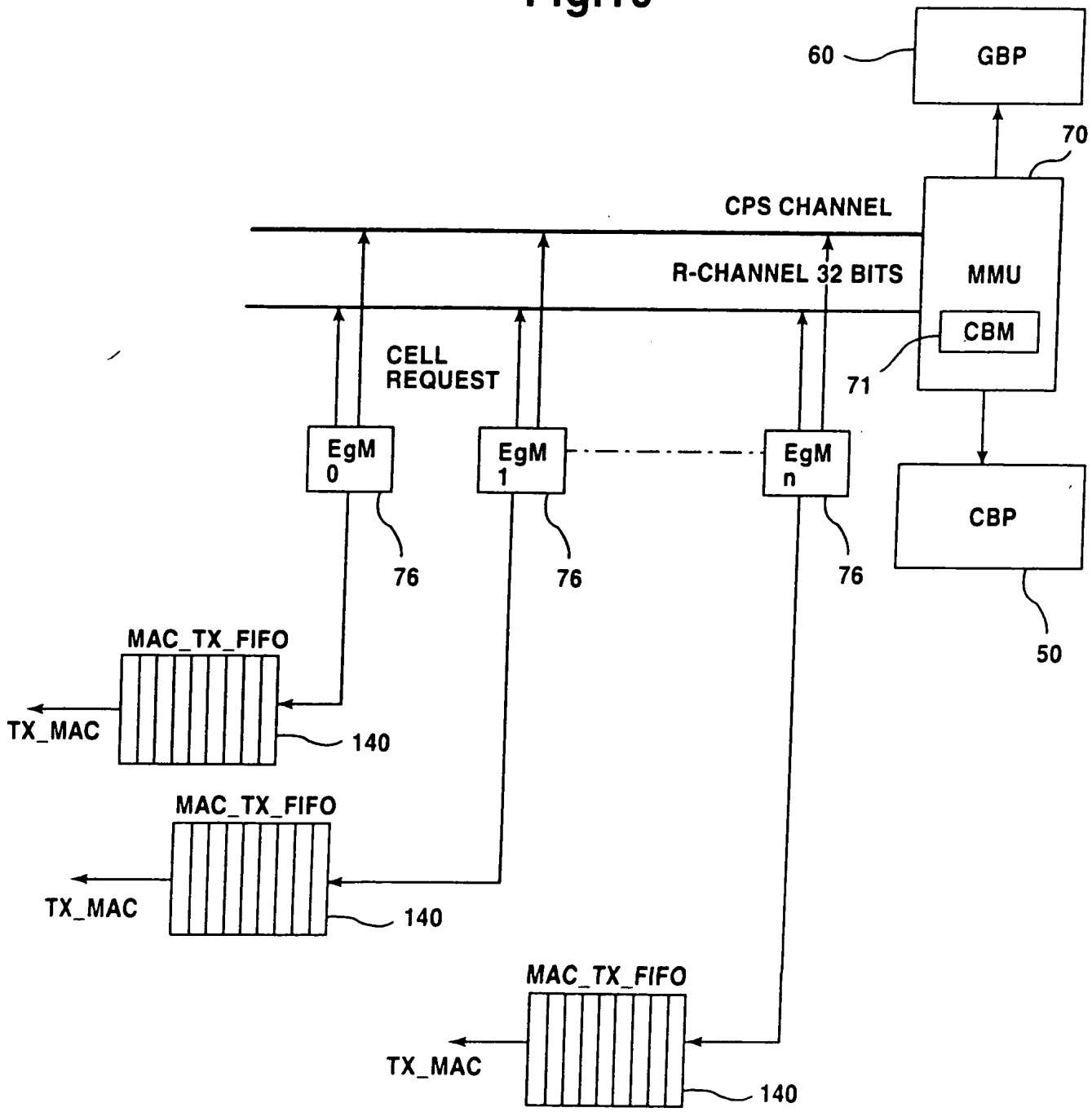

60
GBP
70
CPS CHANNEL
R-CHANNEL 32 BITS
MMU
CBM
71
CELL
REQUEST
EgM
0
EgM
1
EgM
n
CBP
76
76
76
50
MAC_TX_FIFO
TX_MAC
140
MAC_TX_FIFO
TX_MAC
140
MAC_TX_FIFO
TX_MAC
140

Fig.11

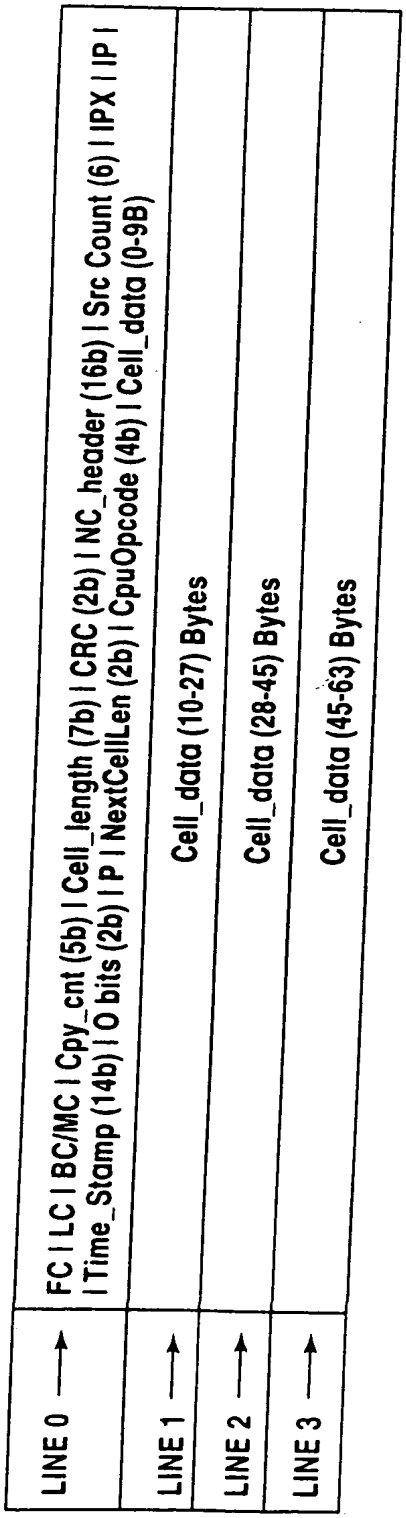

LINE 0
FC | LC | BC/MC | Cpy_cnt (5b) | Cell_length (7b) | CRC (2b) | NC_header (16b) | Src Count (6) | IPX | IP | | Time_Stamp (14b) | O bits (2b) | P | NextCellLen (2b) | CpuOpcode (4b) | Cell_data (0-9B)
LINE 1
Cell_data (10-27) Bytes
LINE 2
Cell_data (28-45) Bytes
LINE 3
Cell_data (45-63) Bytes

Fig.12

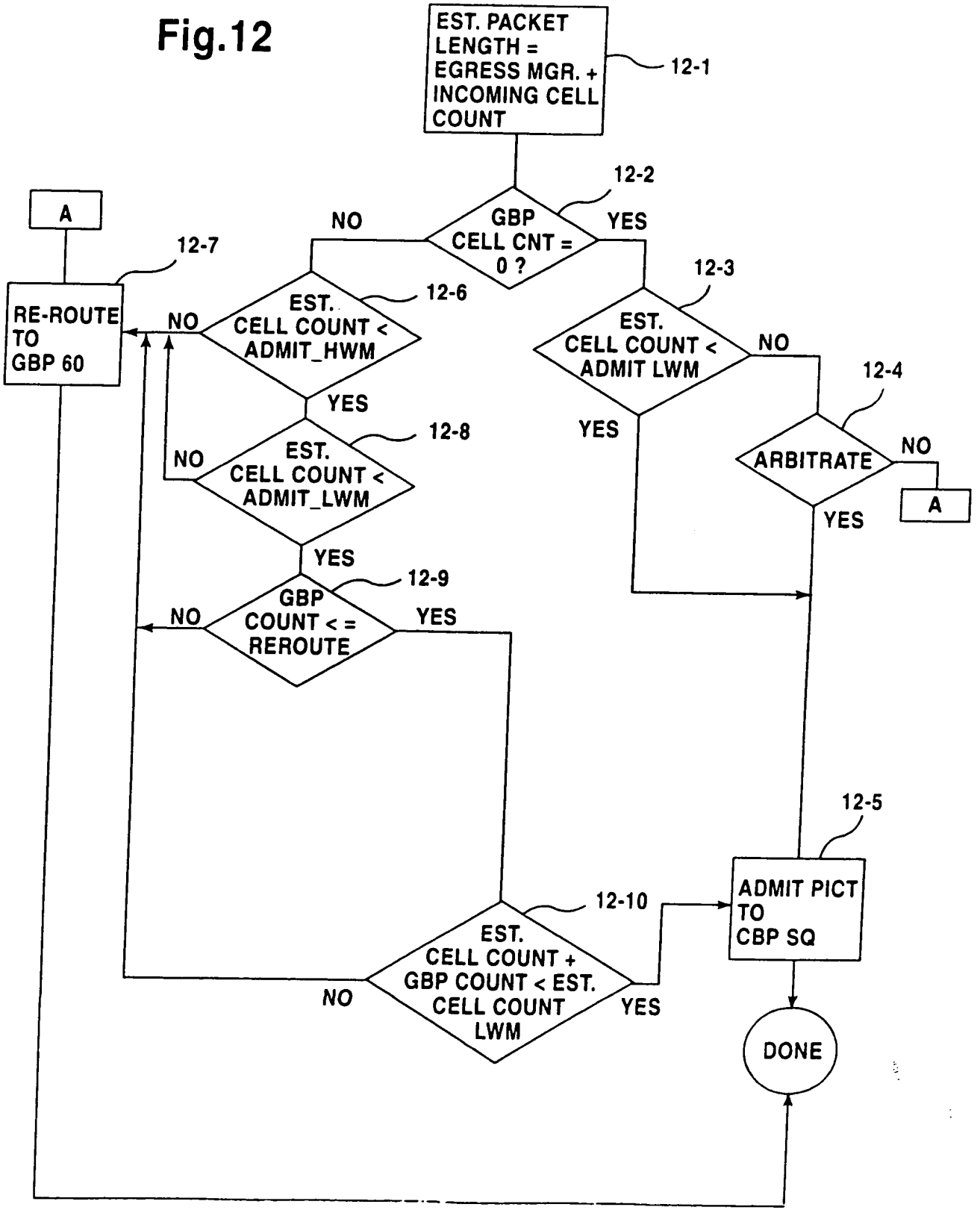

EST. PACKET LENGTH = EGRESS MGR. + INCOMING CELL COUNT
12-1
12-2
GBP CELL CNT = 0 ?
NO
YES
12-3
EST. CELL COUNT < ADMIT LWM
NO
YES
12-4
ARBITRATE
NO
YES
A
12-6
EST. CELL COUNT < ADMIT_HWM
NO
YES
12-8
EST. CELL COUNT < ADMIT_LWM
NO
YES
12-9
GBP COUNT < = REROUTE
NO
YES
12-7
A
RE-ROUTE TO GBP 60
12-5
ADMIT PICT TO CBP SQ
12-10
EST. CELL COUNT + GBP COUNT < EST. CELL COUNT LWM
NO
YES
DONE

Fig.13

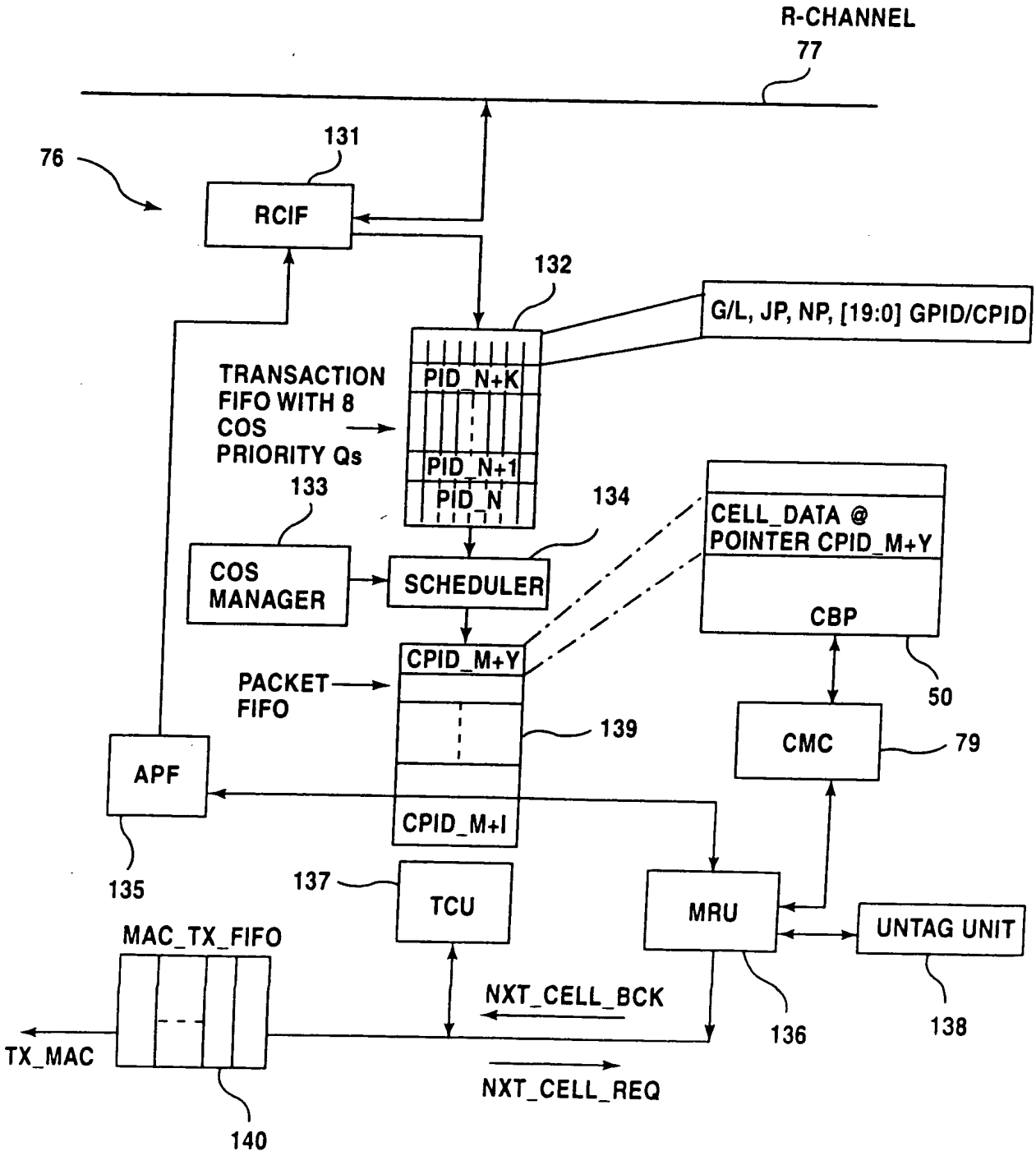

R-CHANNEL
77
76
131
RCIF
132
G/L, JP, NP, [19:0] GPID/CPID
TRANSACTION FIFO WITH 8 COS PRIORITY Qs
PID_N+K
PID_N+1
PID_N
133
134
COS MANAGER
SCHEDULER
CELL_DATA @ POINTER CPID_M+Y
CBP
50
CPID_M+Y
PACKET FIFO
139
CMC
79
APF
CPID_M+I
135
137
TCU
MRU
UNTAG UNIT
MAC_TX_FIFO
NXT_CELL_BCK
136
138
TX_MAC
NXT_CELL_REQ
140

Fig.14

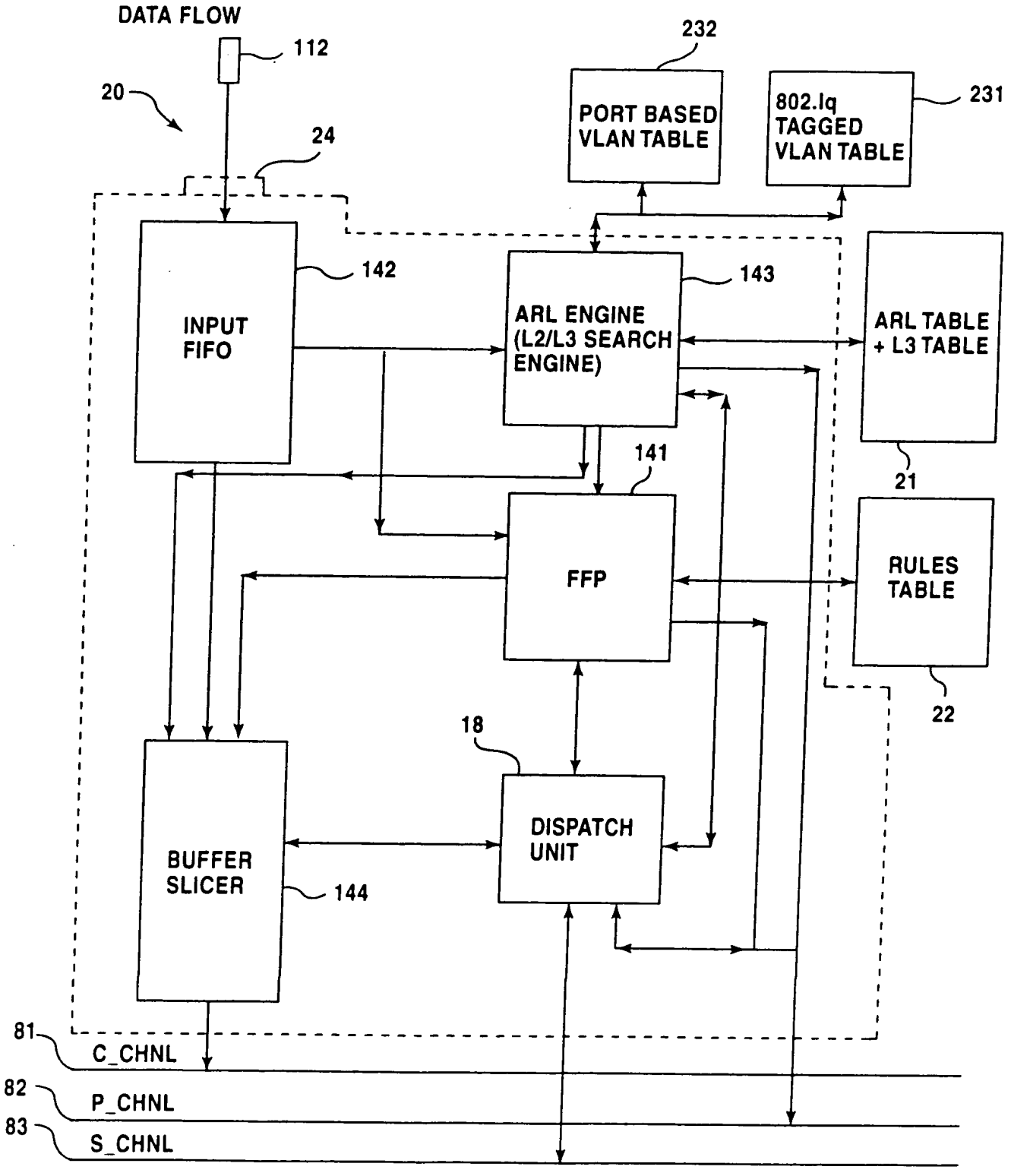

DATA FLOW
112
20
24
232
PORT BASED VLAN TABLE
802.1q TAGGED VLAN TABLE
231
142
143
INPUT FIFO
ARL ENGINE (L2/L3 SEARCH ENGINE)
ARL TABLE + L3 TABLE
141
21
FFP
RULES TABLE
22
18
DISPATCH UNIT
BUFFER SLICER
144
81
C_CHNL
82
P_CHNL
83
S_CHNL

Fig.15

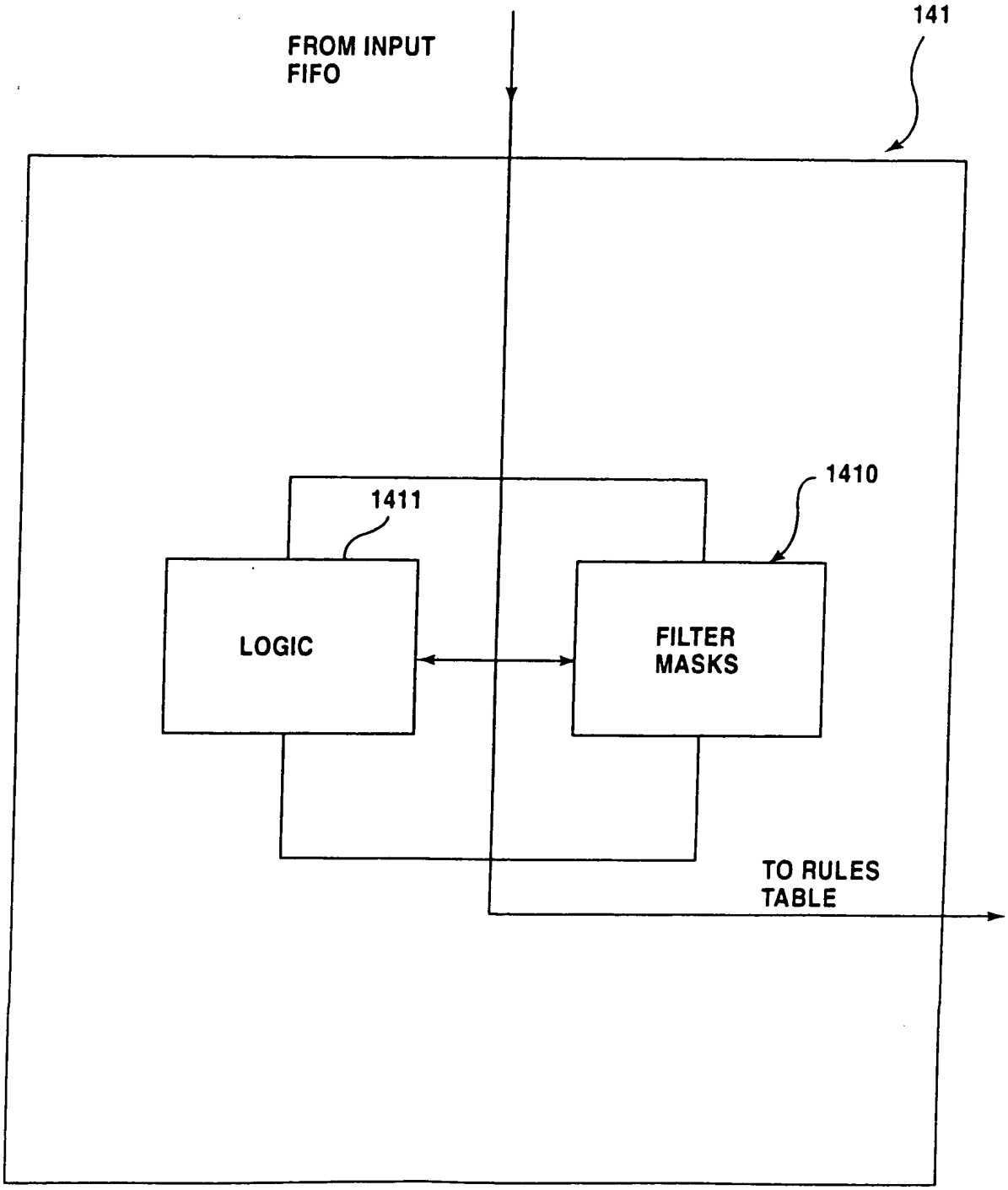

141
FROM INPUT FIFO
1410
1411
LOGIC
FILTER MASKS
TO RULES TABLE

Fig.16

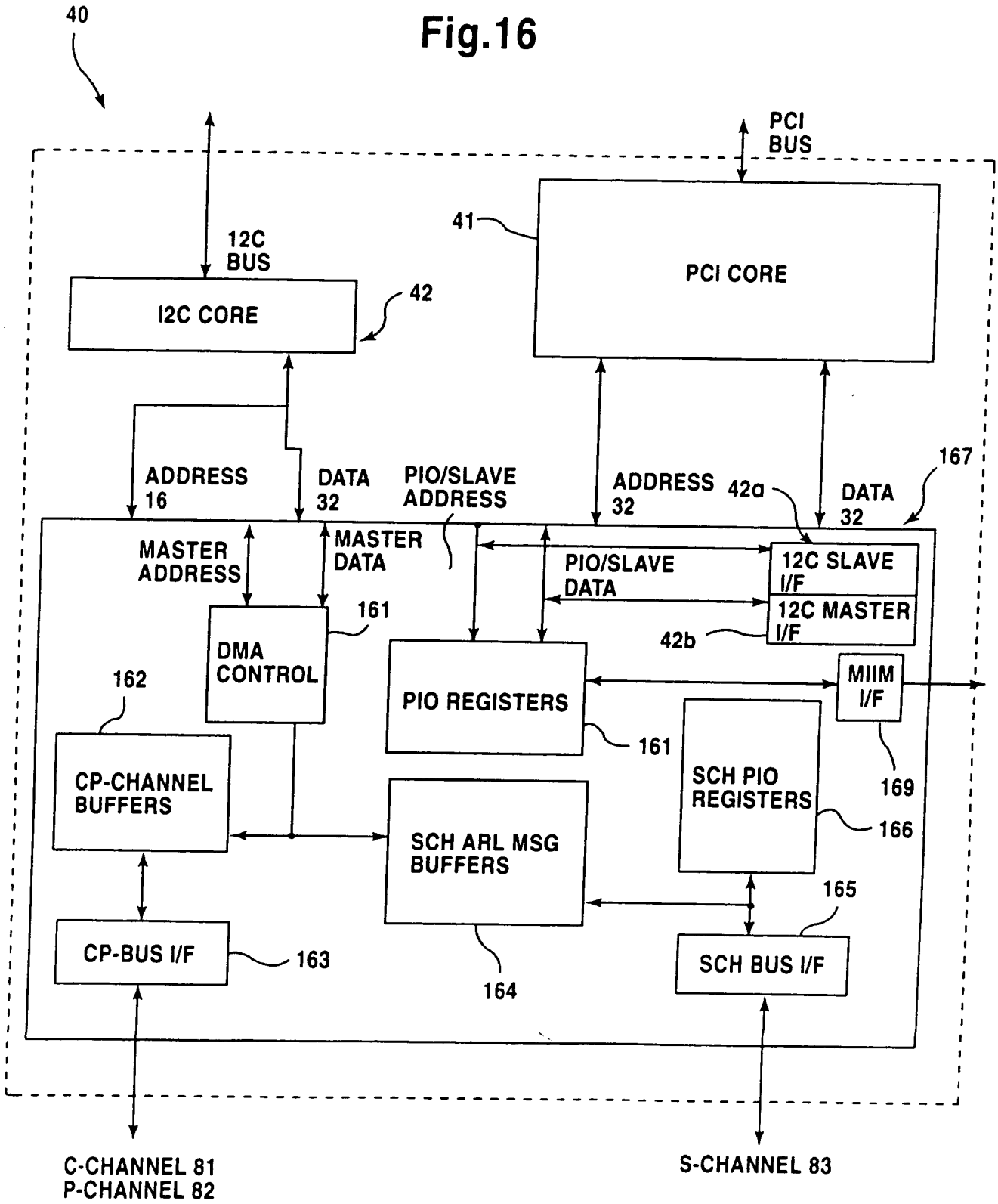

40
PCI BUS
41
PCI CORE
12C BUS
I2C CORE
42
ADDRESS 16
DATA 32
PIO/SLAVE ADDRESS
ADDRESS 32
42a
DATA 32
167
MASTER ADDRESS
MASTER DATA
PIO/SLAVE DATA
12C SLAVE I/F
12C MASTER I/F
42b
161
DMA CONTROL
162
PIO REGISTERS
MIIM I/F
161
CP-CHANNEL BUFFERS
SCH PIO REGISTERS
169
166
SCH ARL MSG BUFFERS
165
CP-BUS I/F
163
164
SCH BUS I/F
C-CHANNEL 81
P-CHANNEL 82
S-CHANNEL 83

Fig.17 FFP PROGRAMMING FLOW CHART

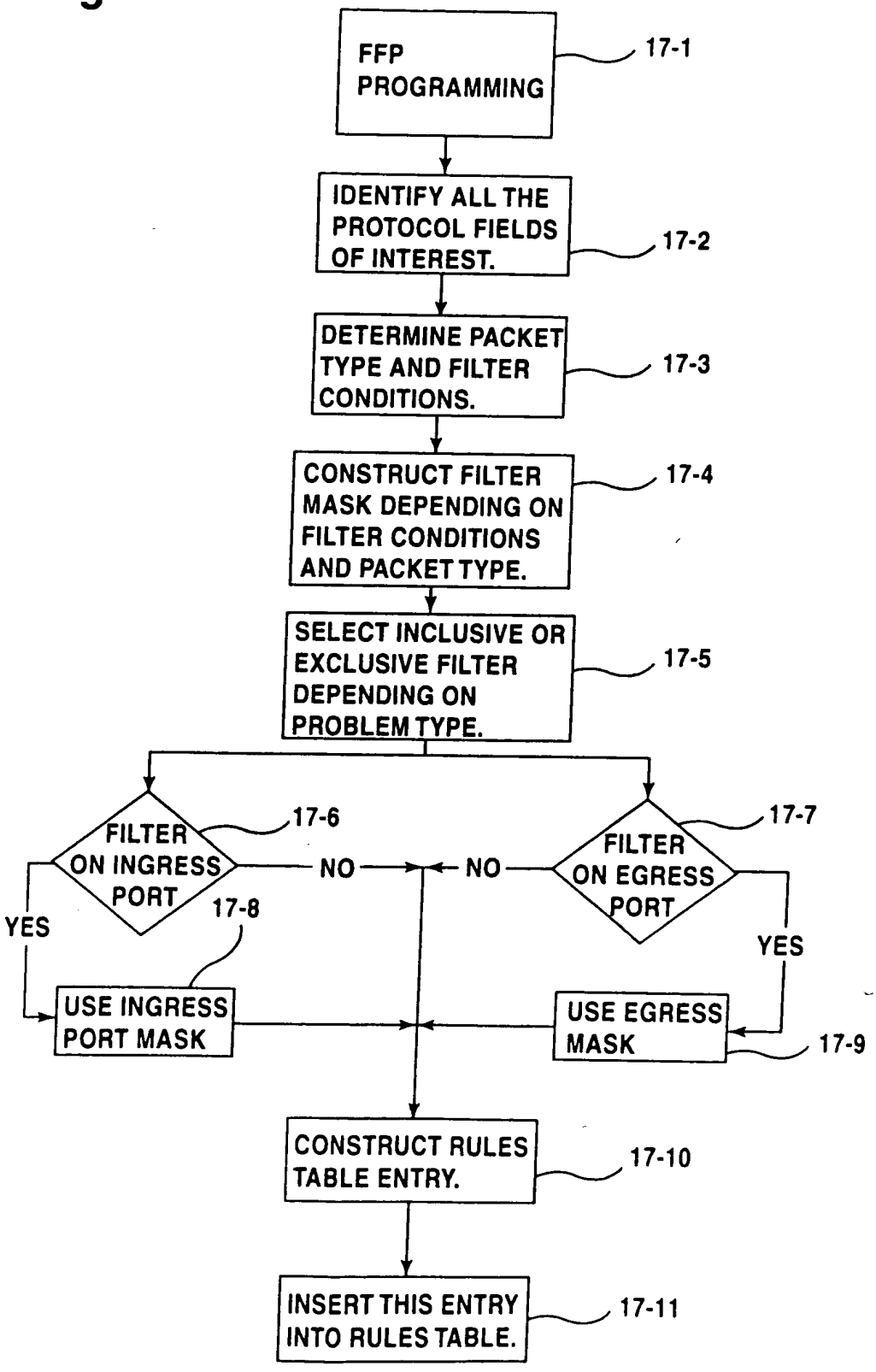


Fig.18

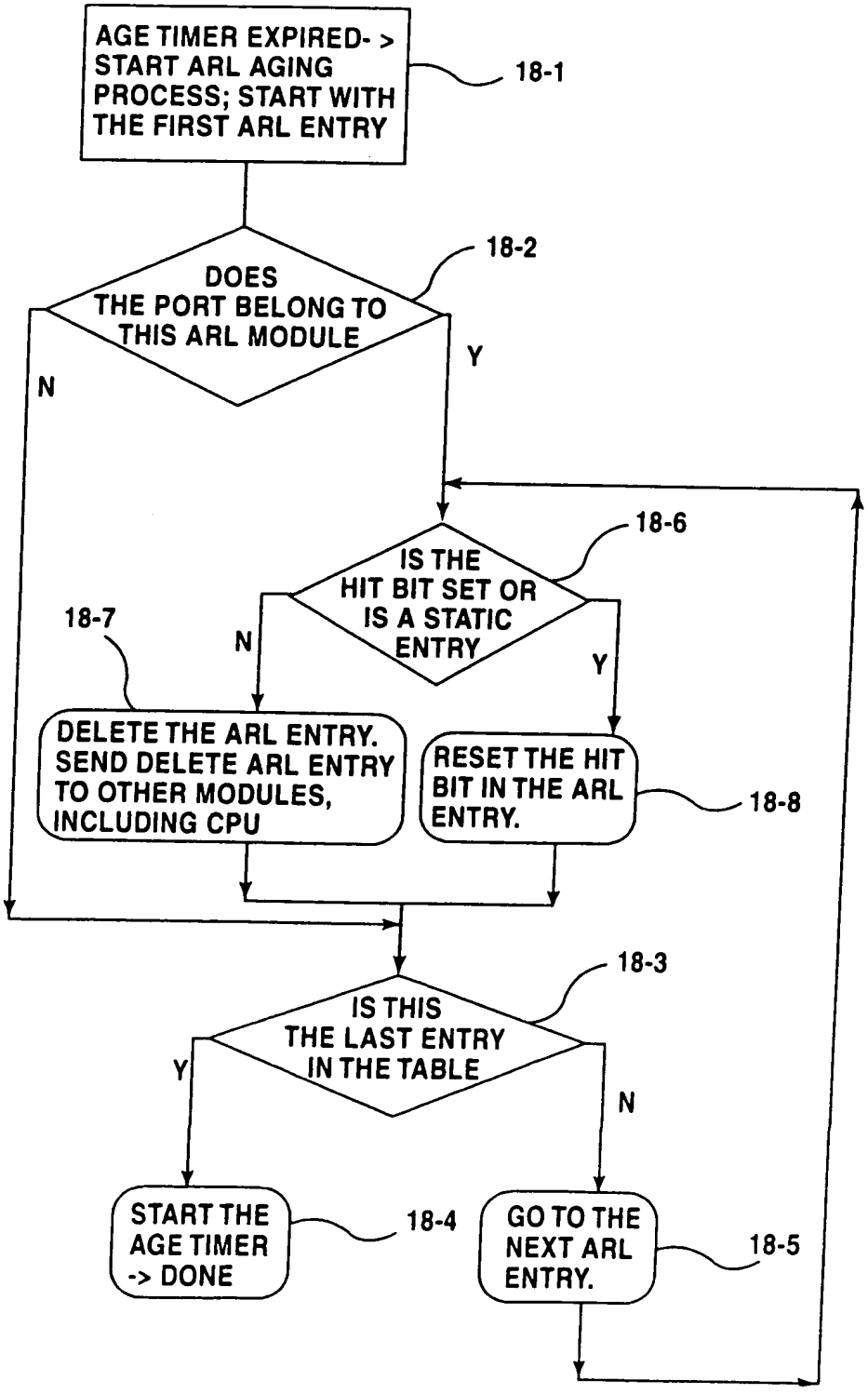

AGE TIMER EXPIRED- > START ARL AGING PROCESS; START WITH THE FIRST ARL ENTRY
18-1
DOES THE PORT BELONG TO THIS ARL MODULE
18-2
Y
N
IS THE HIT BIT SET OR IS A STATIC ENTRY
18-6
N
Y
18-7
DELETE THE ARL ENTRY. SEND DELETE ARL ENTRY TO OTHER MODULES, INCLUDING CPU
RESET THE HIT BIT IN THE ARL ENTRY.
18-8
IS THIS THE LAST ENTRY IN THE TABLE
18-3
Y
N
START THE AGE TIMER -> DONE
18-4
GO TO THE NEXT ARL ENTRY.
18-5

Fig.19

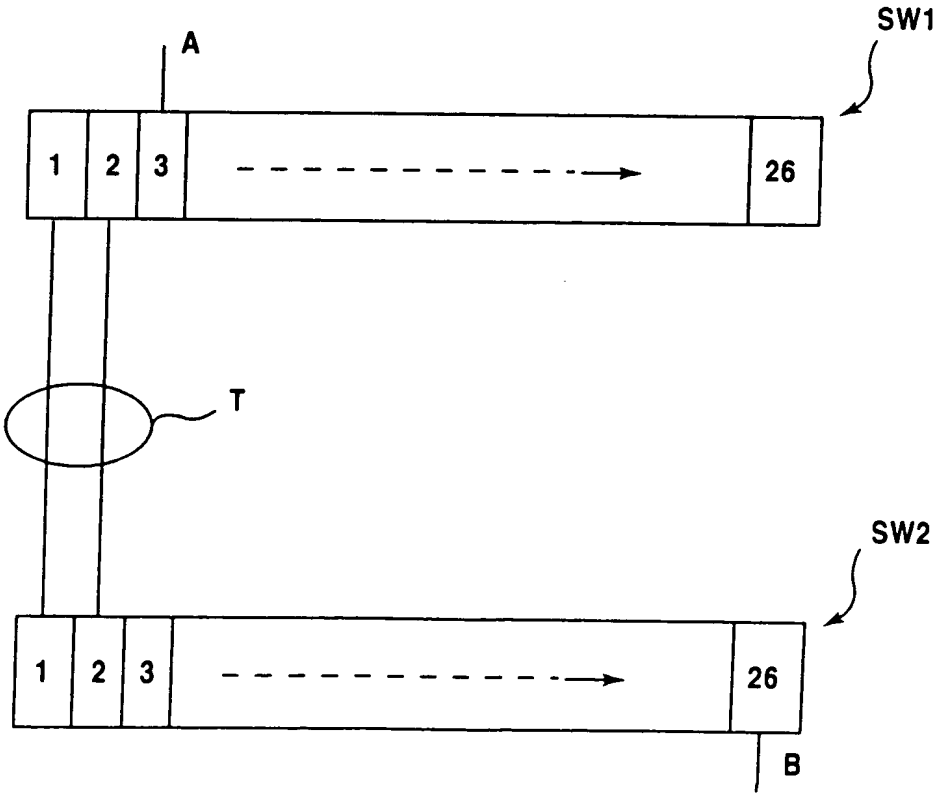


Fig.20

FIELD	HEADER	SIZE	OFFSET FOR ETHERNET II UNTAGGED	OFFSET FOR ETHERNET II TAGGED	OFFSET FOR SNAP UNTAGGED	OFFSET FOR SNAP TAGGED
DESTINATION MAC ADDRESS	MAC	6 BYTES	0	0	0	0
SOURCE MAC ADDRESS	MAC	6 BYTES	6	6	6	6
PROTOCOL TYPE	MAC	2 BYTES	12	16	20	24
DESTINATION TYPE	802.3	1 BYTE	NA	NA	14	18
SOURCE SAP	802.3	1 BYTE	NA	NA	15	19
802.1p PRIORITY	MAC	3 BITS	NA	14	NA	14
VLAN Id	MAC	12 BITS	NA	14+14b	NA	14+14b
TOS PRECEDENCE	IP	3 BITS	15	19	23	27
DIFFERENTIATED SERVICES	IP	6 BITS	15	19	23	27
SOURCE IP ADDRESS	IP	4 BYTES	26	30	34	38
DESTINATION IP ADDRESS	IP	4 BYTES	30	34	38	42
PROTOCOL	IP	1 BYTE	23	27	31	35
SOURCE PORT	TCP/ UDP	2 BYTES	34	38	42	46
DESTINATION PORT	TCP/ UDP	2 BYTES	36	40	44	48
TCP CONTROL FLAGS (FOR ALIGNING ON BYTE BOUNDARY 2 BITS OF RESERVED BITS PRECEDING THIS FIELD IS INCLUDED)	TCP	1 BYTE	47	51	55	59
DATA AT OFFSET 1	NA	8 BYTES	DATA OFFSET1 FROM START OF IP/IPX HEADER	DATA OFFSET1 FROM START OF IP/IPX HEADER	DATA OFFSET1 FROM START OF IP/IPX HEADER	DATA OFFSET1 FROM START OF IP/IPX HEADER
DATA AT OFFSET 2	NA	8 BYTES	DATA OFFSET2 FROM START OF IP/IPX HEADER	DATA OFFSET2 FROM START OF IP/IPX HEADER	DATA OFFSET2 FROM START OF IP/IPX HEADER	DATA OFFSET2 FROM START OF IP/IPX HEADER
DATA AT OFFSET 3	NA	8 BYTES	DATA OFFSET3 FROM START OF IP/IPX HEADER	DATA OFFSET3 FROM START OF IP/IPX HEADER	DATA OFFSET3 FROM START OF IP/IPX HEADER	DATA OFFSET3 FROM START OF IP/IPX HEADER
DATA AT OFFSET 4	NA	8 BYTES	DATA OFFSET4 FROM START OF IP/IPX HEADER	DATA OFFSET4 FROM START OF IP/IPX HEADER	DATA OFFSET4 FROM START OF IP/IPX HEADER	DATA OFFSET4 FROM START OF IP/IPX HEADER

Fig.21a

FILTER MASK FORMAT:

FILTER ENABLE (1b)	COUNTER (5b)	Rem PORT (1b)	OUTPUT MOD (5b)	OUTPUT PORT (6b)	TOS Prec (3b)	Diff Serv (6b)	802.1p PRIOR (3b)

NMA ENB (1b)	NO MATCH ACTION (10b)	DATA OFFSET 4 (7b)	DATA OFFSET 3 (7b)	DATA OFFSET 2 (7b)	DATA OFFSET 1 (7b)	INGRESS PORT MASK (6b)	EGRESS MOD ID MASK (5b)	EGRESS PORT MASK (6b)
FIELD MASK								

Fig.21b

FIELD MASK FORMAT:

DEST MAC ADDR (6B)	SRC MAC ADDR (6B)	PROT TYPE (2B)	DEST SAP (1B)	SRC SAP (1B)	802.1 p PRIO (3b)	VLAN ID (12b)	TOS PREC (3b)	DIFF SERV (6b)	SRC IP ADDR (4B)	DEST IP ADDR (4B)	PROT IP (1B)	SRC PORT (2B)	DEST PORT (2B)

TCP CNTR FLAGS (1B)	DATA 1 (8B)	DATA 2 (8 B)	DATA 3 (8B)	DATA 4 (8B)

Fig.22

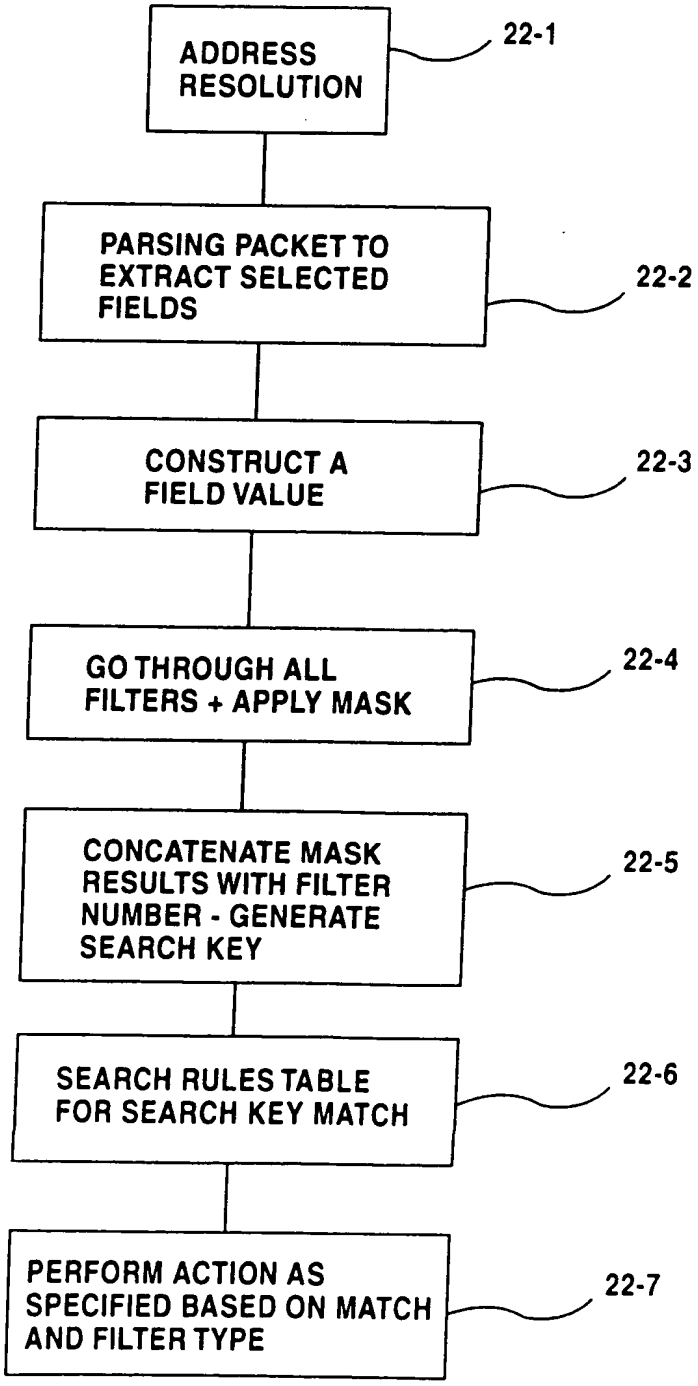

ADDRESS RESOLUTION
22-1
PARSING PACKET TO EXTRACT SELECTED FIELDS
22-2
CONSTRUCT A FIELD VALUE
22-3
GO THROUGH ALL FILTERS + APPLY MASK
22-4
CONCATENATE MASK RESULTS WITH FILTER NUMBER - GENERATE SEARCH KEY
22-5
SEARCH RULES TABLE FOR SEARCH KEY MATCH
22-6
PERFORM ACTION AS SPECIFIED BASED ON MATCH AND FILTER TYPE
22-7

Fig.23

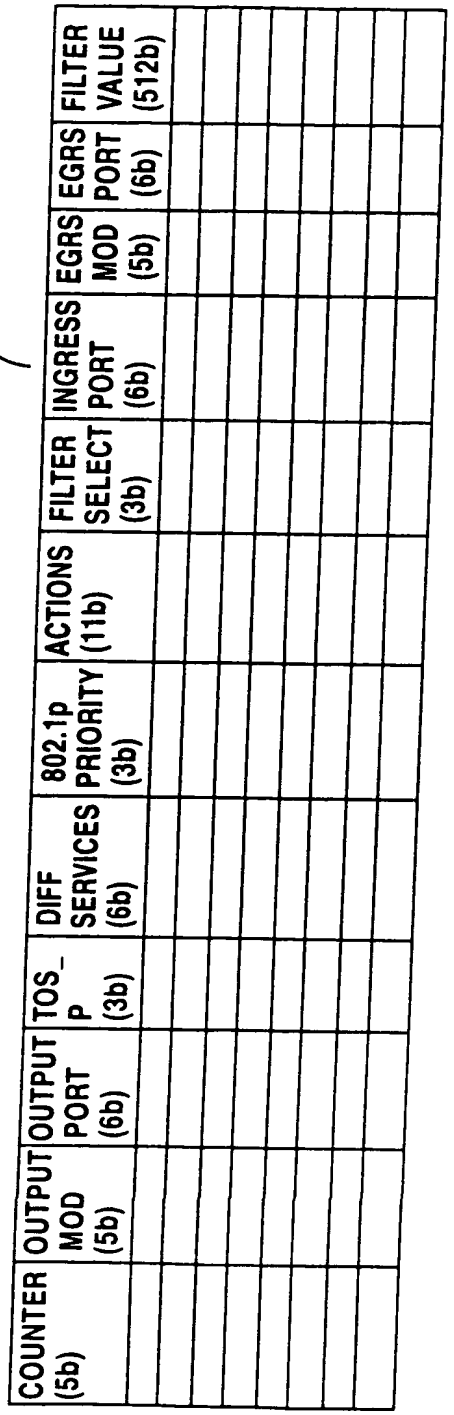

22
COUNTER (5b)
OUTPUT MOD (5b)
OUTPUT PORT (6b)
TOS_P (3b)
DIFF SERVICES (6b)
802.1p PRIORITY (3b)
ACTIONS (11b)
FILTER SELECT (3b)
INGRESS PORT (6b)
EGRS MOD (5b)
EGRS PORT (6b)
FILTER VALUE (512b)

Fig.24

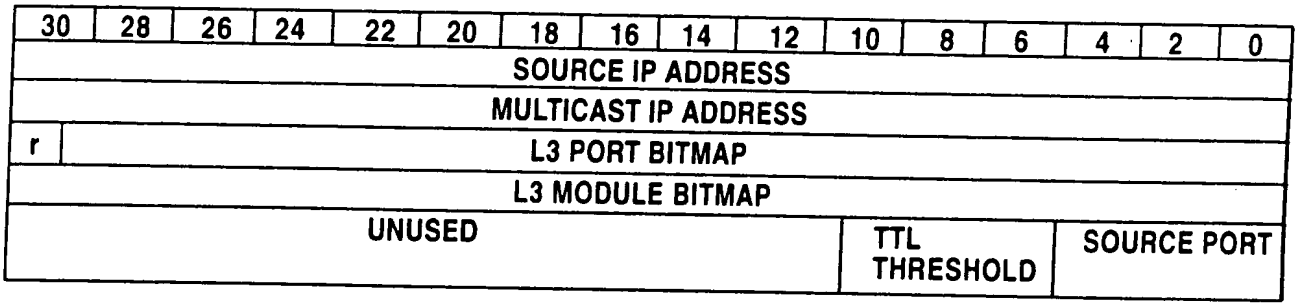
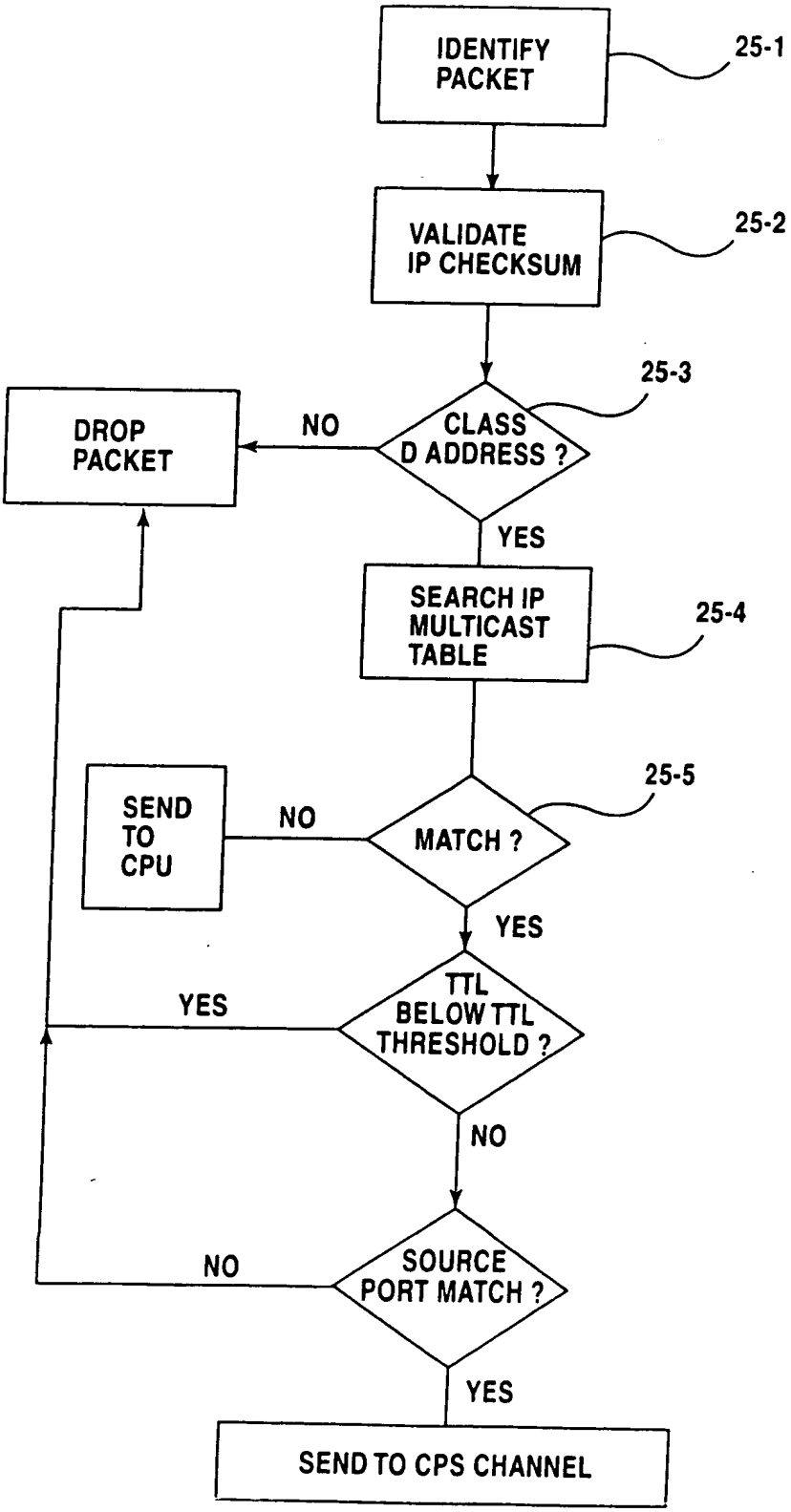

30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
SOURCE IP ADDRESS
MULTICAST IP ADDRESS
r
L3 PORT BITMAP
L3 MODULE BITMAP
UNUSED
TTL THRESHOLD
SOURCE PORT

Fig.25


IDENTIFY PACKET
25-1
VALIDATE IP CHECKSUM
25-2
CLASS D ADDRESS ?
25-3
NO
DROP PACKET
YES
SEARCH IP MULTICAST TABLE
25-4
MATCH ?
25-5
NO
SEND TO CPU
YES
TTL BELOW TTL THRESHOLD ?
YES
NO
SOURCE PORT MATCH ?
NO
YES
SEND TO CPS CHANNEL

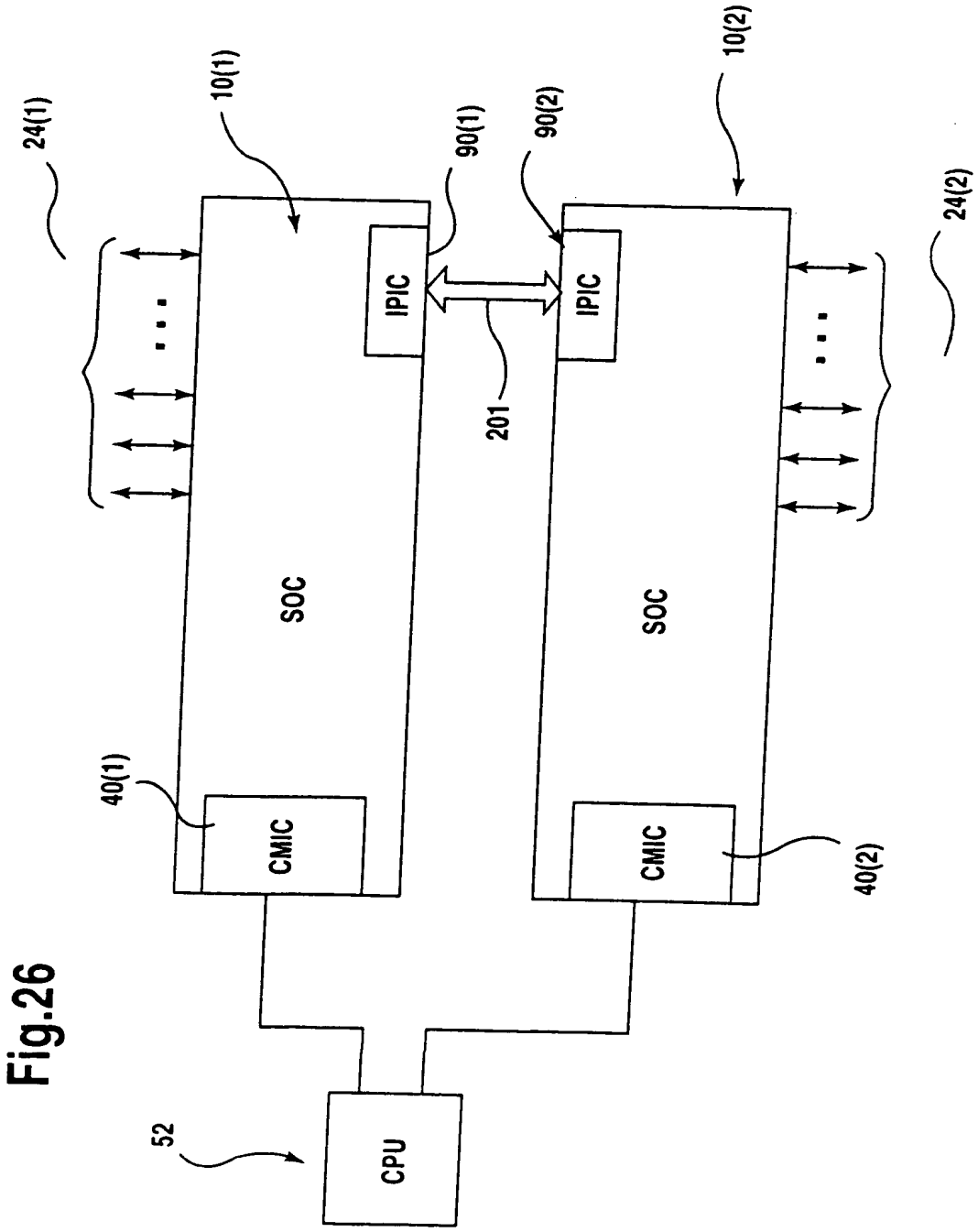

24(1)
10(1)
90(1)
90(2)
10(2)
24(2)
IPIC
IPIC
201
SOC
SOC
40(1)
CMIC
CMIC
40(2)
52
CPU

Fig.26

Fig.27a

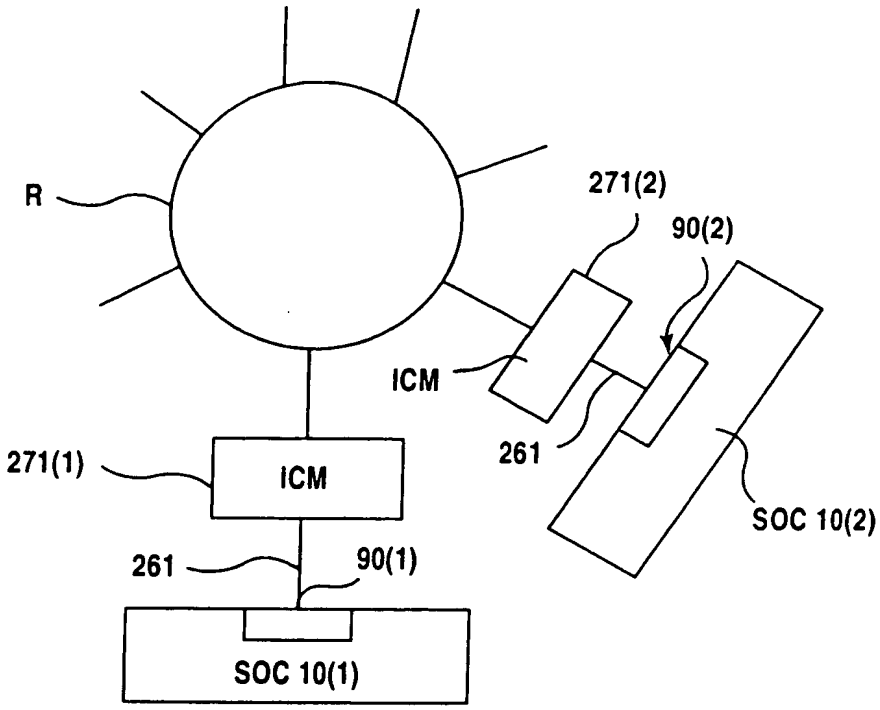


Fig.27b

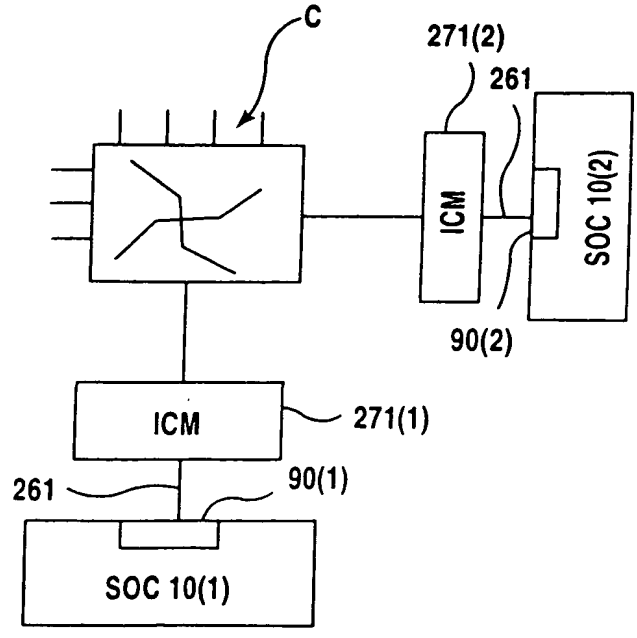


Fig.28

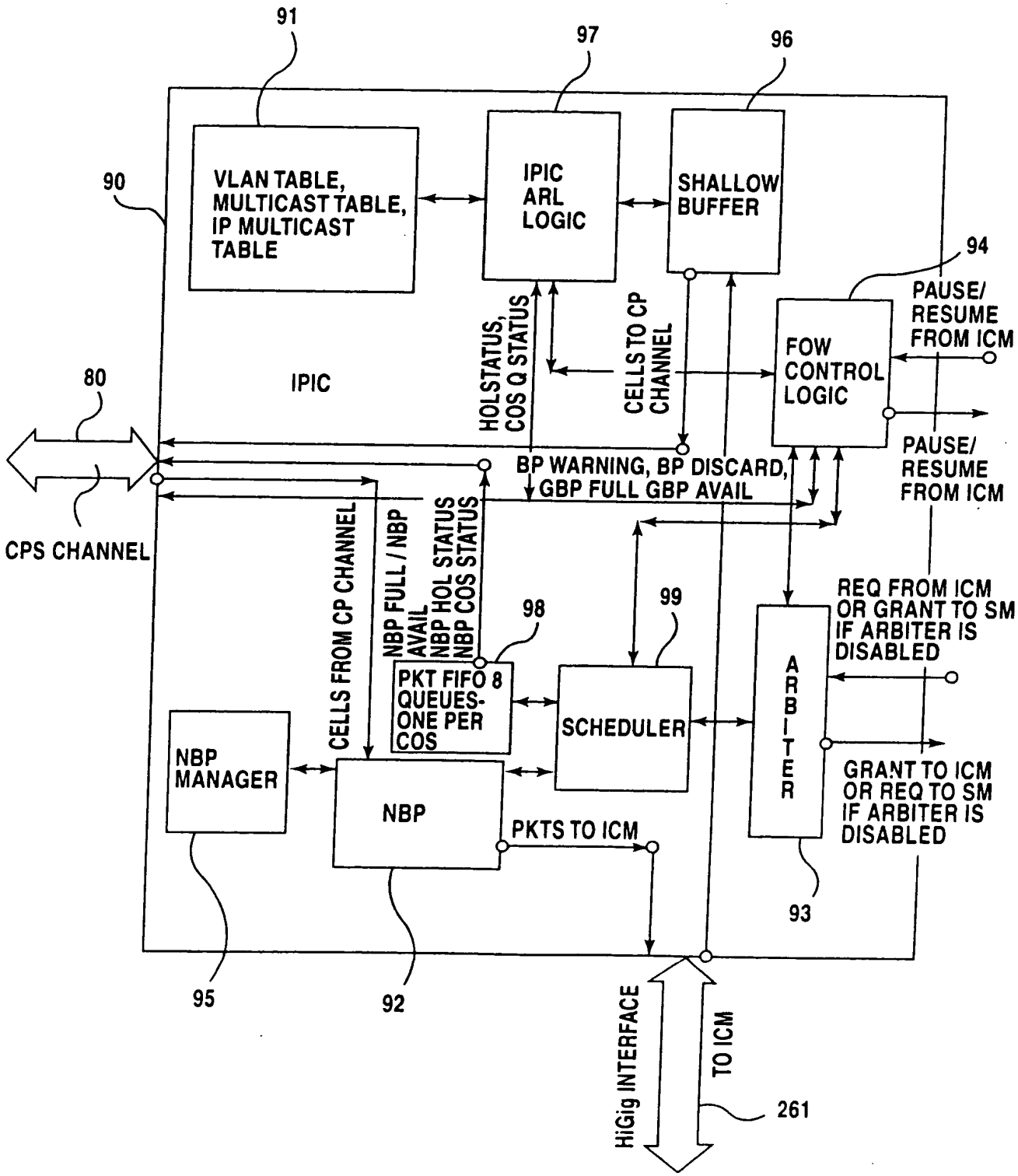

91
97
96
90
VLAN TABLE, MULTICAST TABLE, IP MULTICAST TABLE
IPIC ARL LOGIC
SHALLOW BUFFER
94
PAUSE/ RESUME FROM ICM
80
IPIC
HOLSTATUS, COS Q STATUS
CELLS TO CP CHANNEL
FOW CONTROL LOGIC
BP WARNING, BP DISCARD, GBP FULL GBP AVAIL
PAUSE/ RESUME FROM ICM
CPS CHANNEL
CELLS FROM CP CHANNEL
NBP FULL / NBP AVAIL
NBP HOL STATUS
NBP COS STATUS
98
99
REQ FROM ICM OR GRANT TO SM IF ARBITER IS DISABLED
PKT FIFO 8 QUEUES- ONE PER COS
SCHEDULER
ARBITER
NBP MANAGER
NBP
PKTS TO ICM
GRANT TO ICM OR REQ TO SM IF ARBITER IS DISABLED
93
95
92
HiGig INTERFACE
TO ICM
261

Fig.29

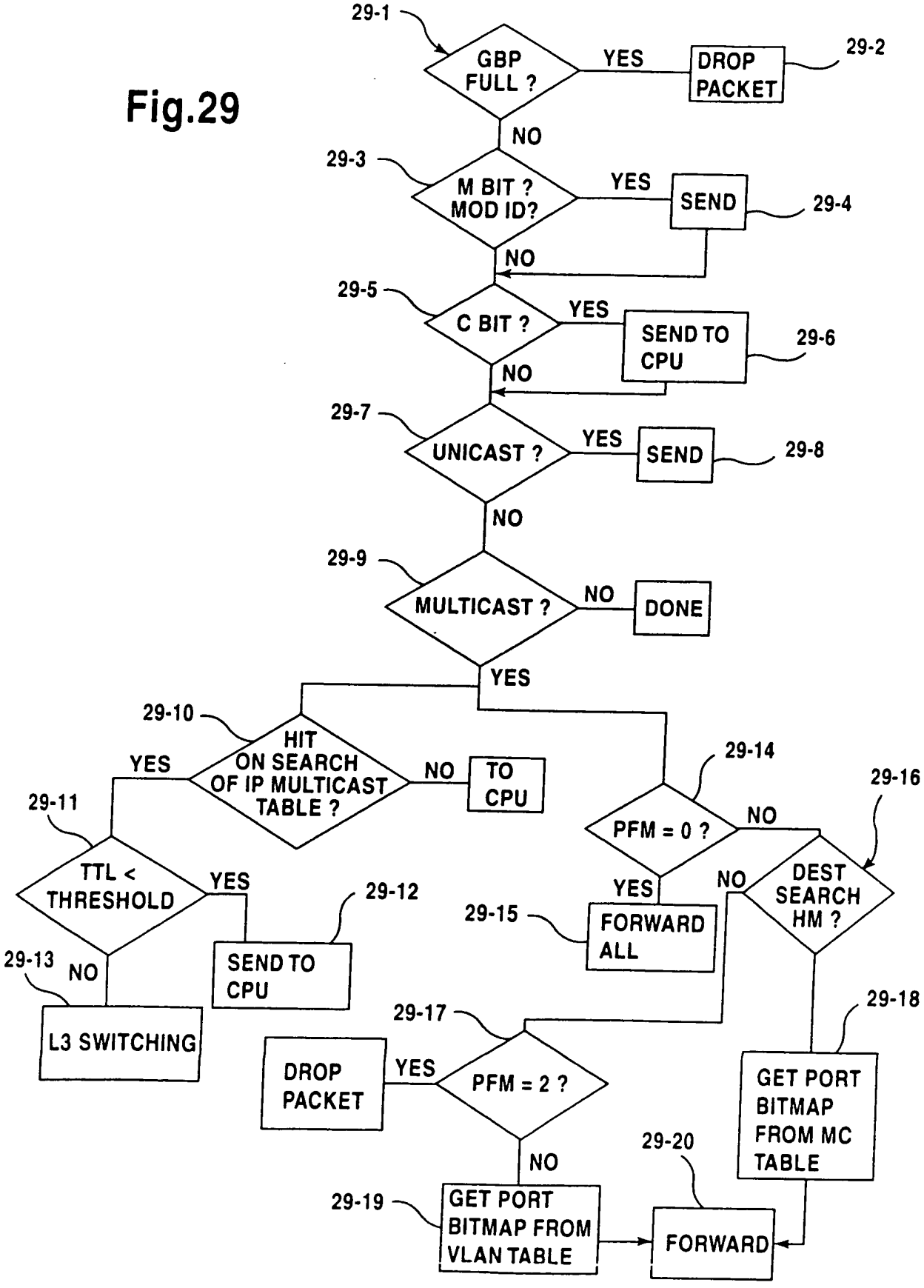

29-1
GBP FULL ?
YES
DROP PACKET
29-2
NO
29-3
M BIT ? MOD ID?
YES
SEND
29-4
NO
29-5
C BIT ?
YES
SEND TO CPU
29-6
NO
29-7
UNICAST ?
YES
SEND
29-8
NO
29-9
MULTICAST ?
NO
DONE
YES
29-10
HIT ON SEARCH OF IP MULTICAST TABLE ?
YES
NO
TO CPU
29-11
TTL < THRESHOLD
YES
29-12
SEND TO CPU
29-13
NO
L3 SWITCHING
29-14
PFM = 0 ?
NO
29-16
YES
29-15
FORWARD ALL
NO
DEST SEARCH HM ?
29-17
DROP PACKET
YES
PFM = 2 ?
29-18
GET PORT BITMAP FROM MC TABLE
NO
29-20
29-19
GET PORT BITMAP FROM VLAN TABLE
FORWARD

Fig.30

COS QUEUE (3b)	C P F	NCA (2b)	802.1p PRIORITY (3b)	RATE COUNTER (8b)	RATE COUNTER THRESHOLD (8b)	RATE DISCARD THRESHOLD ID (8b)	NEW CODE POINT (6b)	NEW COS QUEUE (3b)	NEW 802.1 PRIORITY (3b)

Fig.31

OFFSET FIELD	OFFSET 1	OFFSET 2	OFFSET 3	OFFSET 4
000	0-15	16-31	32-47	48-63
001	8-23	24-39	40-55	56-71
010	16-31	32-47	48-63	64-79
011	24-39	40-55	56-71	72-87
100	32-47	48-63	64-79	80-95
101	40-55	56-71	72-87	88-103
110	48-63	64-79	80-95	96-111
111	56-71	72-87	88-103	104-119

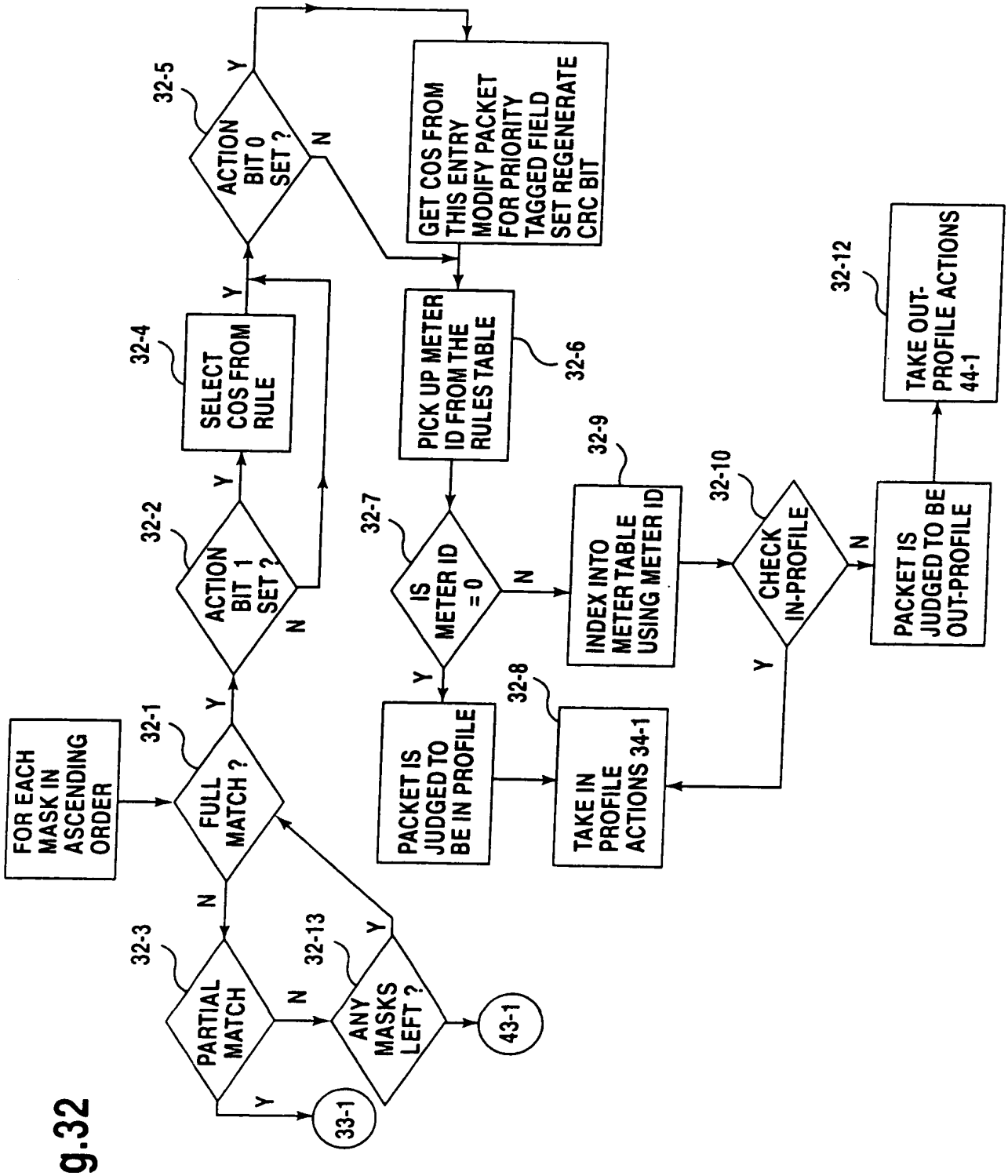

FOR EACH MASK IN ASCENDING ORDER
32-1
FULL MATCH ?
Y
N
32-2
ACTION BIT 1 SET ?
Y
N
32-4
SELECT COS FROM RULE
32-5
ACTION BIT 0 SET ?
Y
N
GET COS FROM THIS ENTRY MODIFY PACKET FOR PRIORITY TAGGED FIELD SET REGENERATE CRC BIT
32-3
PARTIAL MATCH
N
Y
32-13
ANY MASKS LEFT ?
Y
N
43-1
33-1
PICK UP METER ID FROM THE RULES TABLE
32-6
32-7
IS METER ID = 0
Y
N
PACKET IS JUDGED TO BE IN PROFILE
32-8
TAKE IN PROFILE ACTIONS 34-1
32-9
INDEX INTO METER TABLE USING METER ID
32-10
CHECK IN-PROFILE
Y
N
PACKET IS JUDGED TO BE OUT-PROFILE
32-12
TAKE OUT-PROFILE ACTIONS 44-1

Fig.32

Fig.33

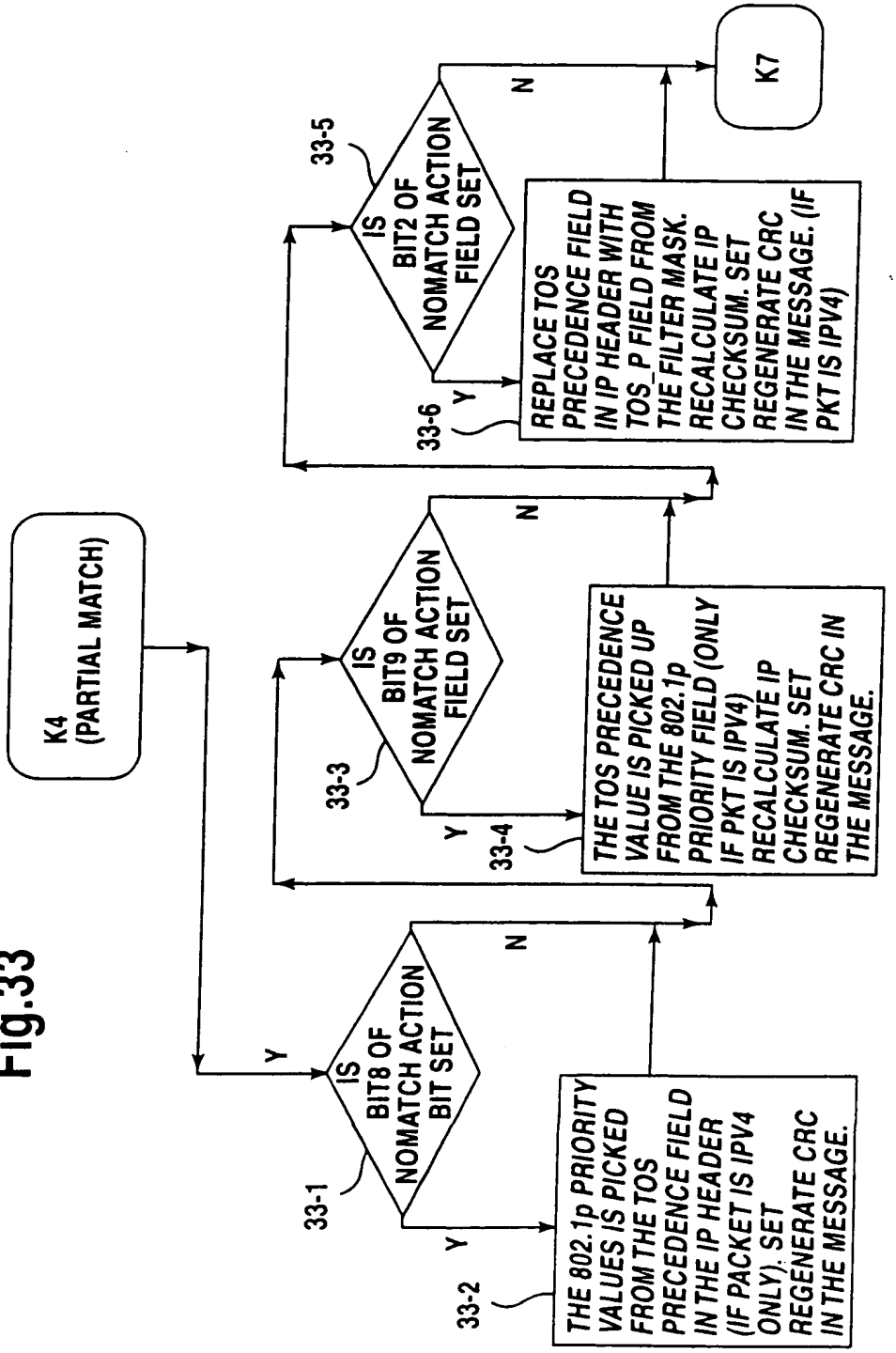
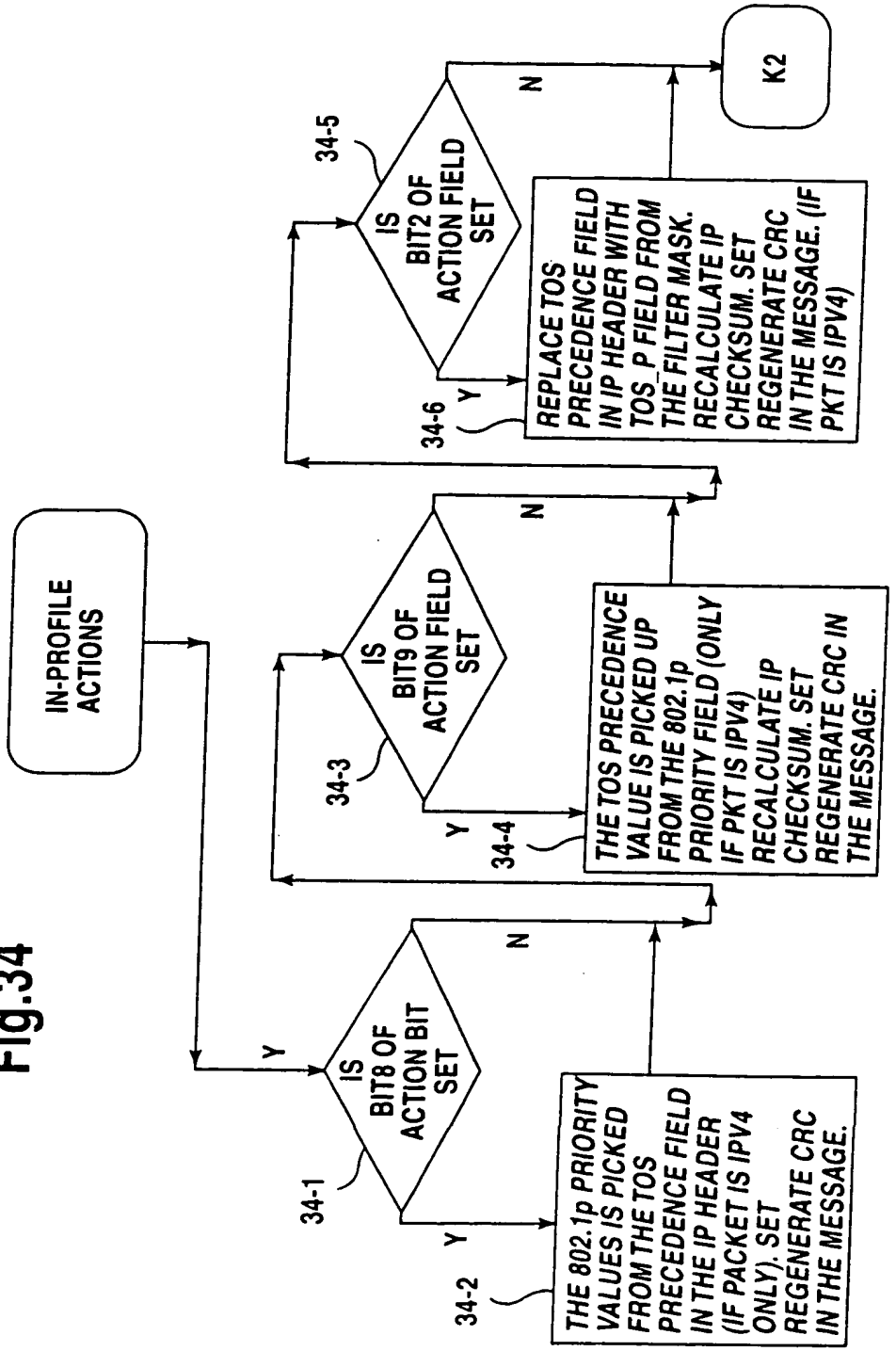

K4
(PARTIAL MATCH)
IS BIT8 OF NOMATCH ACTION BIT SET
33-1
Y
N
THE 802.1p PRIORITY VALUES IS PICKED FROM THE TOS PRECEDENCE FIELD IN THE IP HEADER (IF PACKET IS IPV4 ONLY). SET REGENERATE CRC IN THE MESSAGE.
33-2
IS BIT9 OF NOMATCH ACTION FIELD SET
33-3
Y
N
THE TOS PRECEDENCE VALUE IS PICKED UP FROM THE 802.1p PRIORITY FIELD (ONLY IF PKT IS IPV4) RECALCULATE IP CHECKSUM. SET REGENERATE CRC IN THE MESSAGE.
33-4
IS BIT2 OF NOMATCH ACTION FIELD SET
33-5
Y
N
REPLACE TOS PRECEDENCE FIELD IN IP HEADER WITH TOS_P FIELD FROM THE FILTER MASK. RECALCULATE IP CHECKSUM. SET REGENERATE CRC IN THE MESSAGE. (IF PKT IS IPV4)
33-6
K7

Fig.34


IN-PROFILE ACTIONS
IS BIT8 OF ACTION BIT SET
34-1
Y
N
THE 802.1p PRIORITY VALUES IS PICKED FROM THE TOS PRECEDENCE FIELD IN THE IP HEADER (IF PACKET IS IPV4 ONLY). SET REGENERATE CRC IN THE MESSAGE.
34-2
IS BIT9 OF ACTION FIELD SET
34-3
Y
N
THE TOS PRECEDENCE VALUE IS PICKED UP FROM THE 802.1p PRIORITY FIELD (ONLY IF PKT IS IPV4) RECALCULATE IP CHECKSUM. SET REGENERATE CRC IN THE MESSAGE.
34-4
IS BIT2 OF ACTION FIELD SET
34-5
Y
N
REPLACE TOS PRECEDENCE FIELD IN IP HEADER WITH TOS_P FIELD FROM THE FILTER MASK. RECALCULATE IP CHECKSUM. SET REGENERATE CRC IN THE MESSAGE. (IF PKT IS IPV4)
34-6
K2

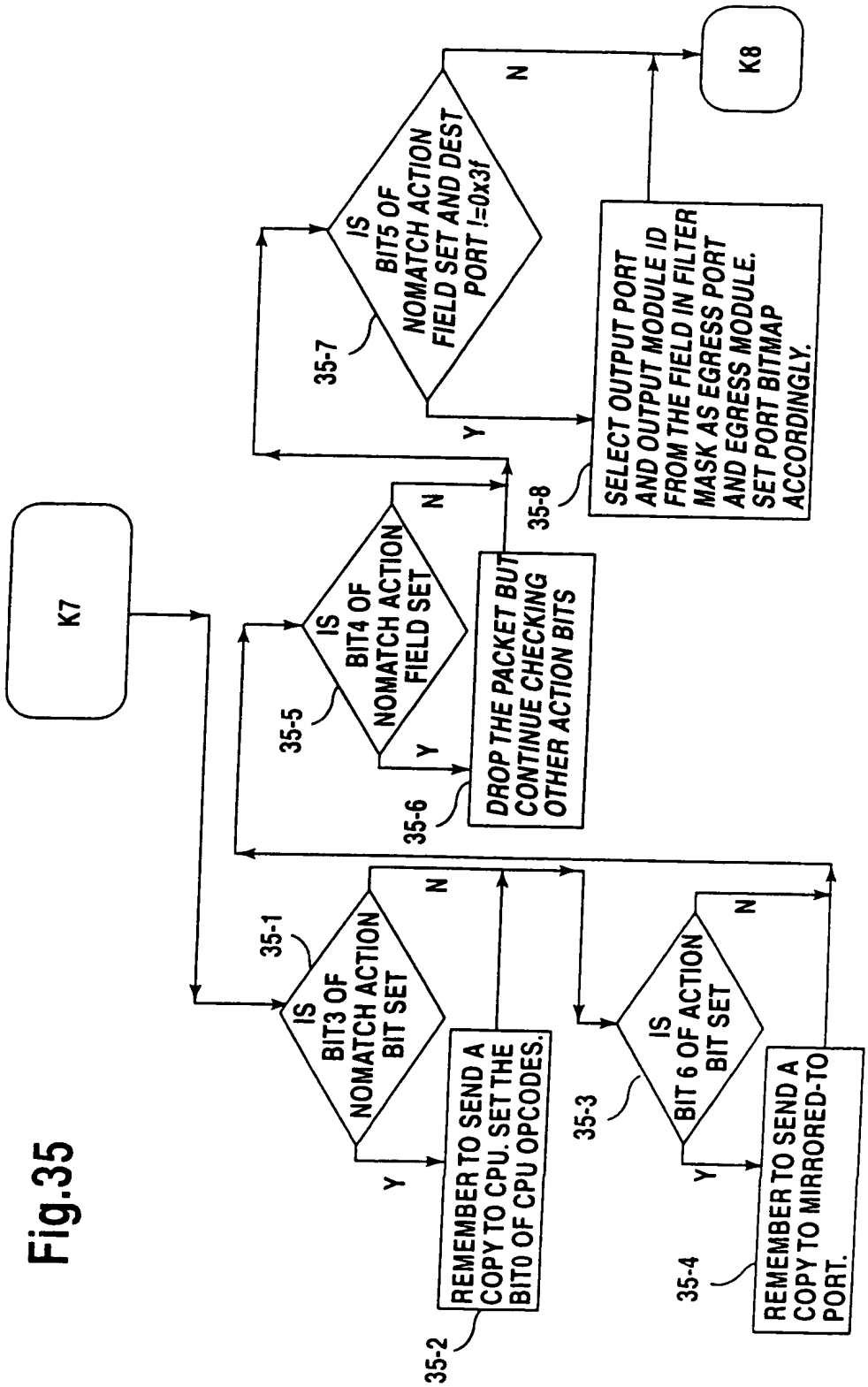

K7
IS BIT3 OF NOMATCH ACTION BIT SET
35-1
Y
N
REMEMBER TO SEND A COPY TO CPU. SET THE BIT0 OF CPU OPCODES.
35-2
IS BIT 6 OF ACTION BIT SET
35-3
Y
N
REMEMBER TO SEND A COPY TO MIRRORED-TO PORT.
35-4
IS BIT4 OF NOMATCH ACTION FIELD SET
35-5
Y
N
DROP THE PACKET BUT CONTINUE CHECKING OTHER ACTION BITS
35-6
IS BIT5 OF NOMATCH ACTION FIELD SET AND DEST PORT !=0x3f
35-7
Y
N
SELECT OUTPUT PORT AND OUTPUT MODULE ID FROM THE FIELD IN FILTER MASK AS EGRESS PORT AND EGRESS MODULE. SET PORT BITMAP ACCORDINGLY.
35-8
K8

Fig.35

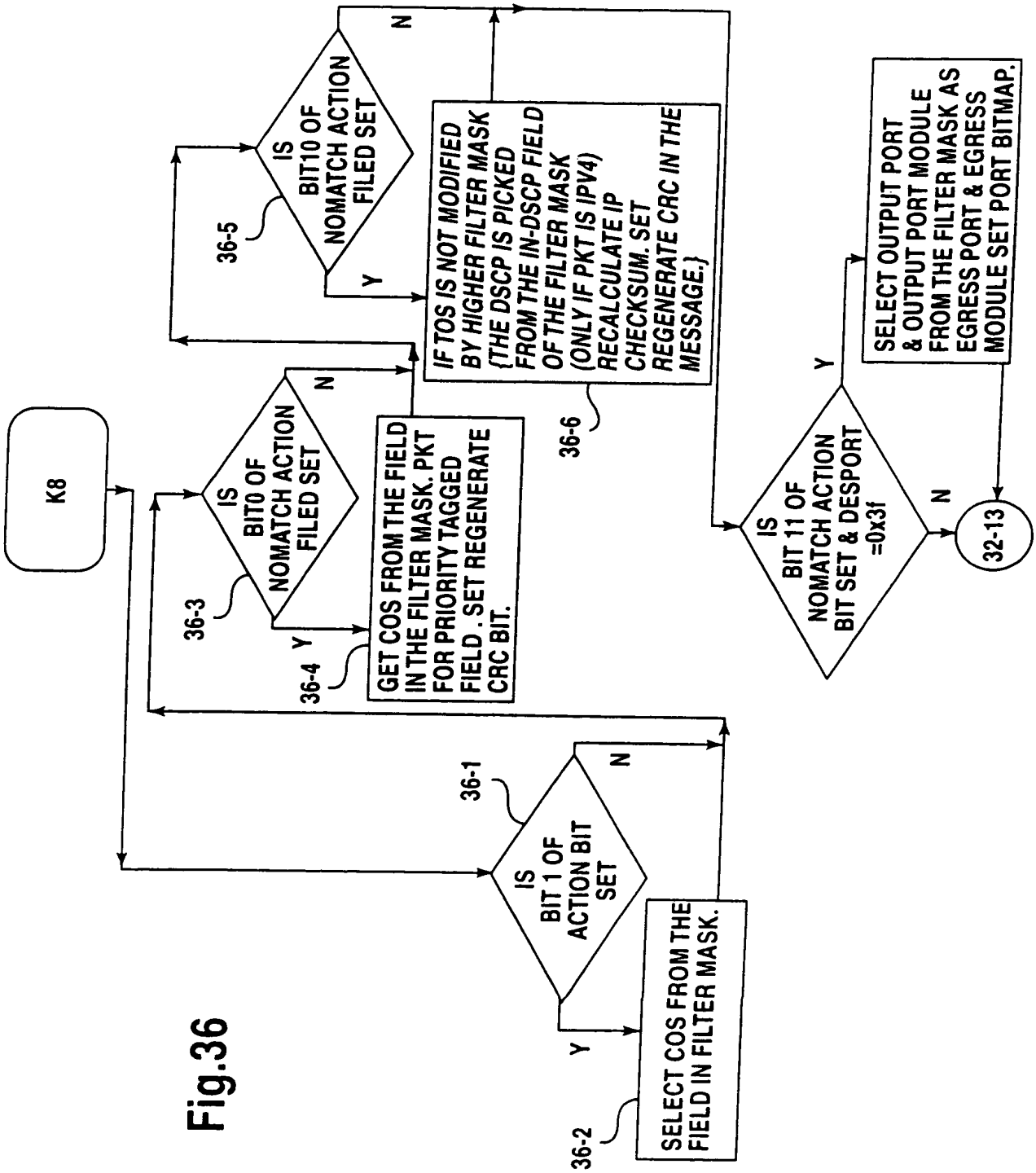

K8
36-1
IS BIT 1 OF ACTION BIT SET
N
Y
36-2
SELECT COS FROM THE FIELD IN FILTER MASK.
36-3
IS BIT0 OF NOMATCH ACTION FILED SET
N
Y
36-4
GET COS FROM THE FIELD IN THE FILTER MASK. PKT FOR PRIORITY TAGGED FIELD . SET REGENERATE CRC BIT.
36-5
IS BIT10 OF NOMATCH ACTION FILED SET
N
Y
IF TOS IS NOT MODIFIED BY HIGHER FILTER MASK (THE DSCP IS PICKED FROM THE IN-DSCP FIELD OF THE FILTER MASK (ONLY IF PKT IS IPV4) RECALCULATE IP CHECKSUM. SET REGENERATE CRC IN THE MESSAGE.)
36-6
IS BIT 11 OF NOMATCH ACTION BIT SET & DESPORT =0x3f
Y
N
SELECT OUTPUT PORT & OUTPUT PORT MODULE FROM THE FILTER MASK AS EGRESS PORT & EGRESS MODULE SET PORT BITMAP.
32-13

Fig.36

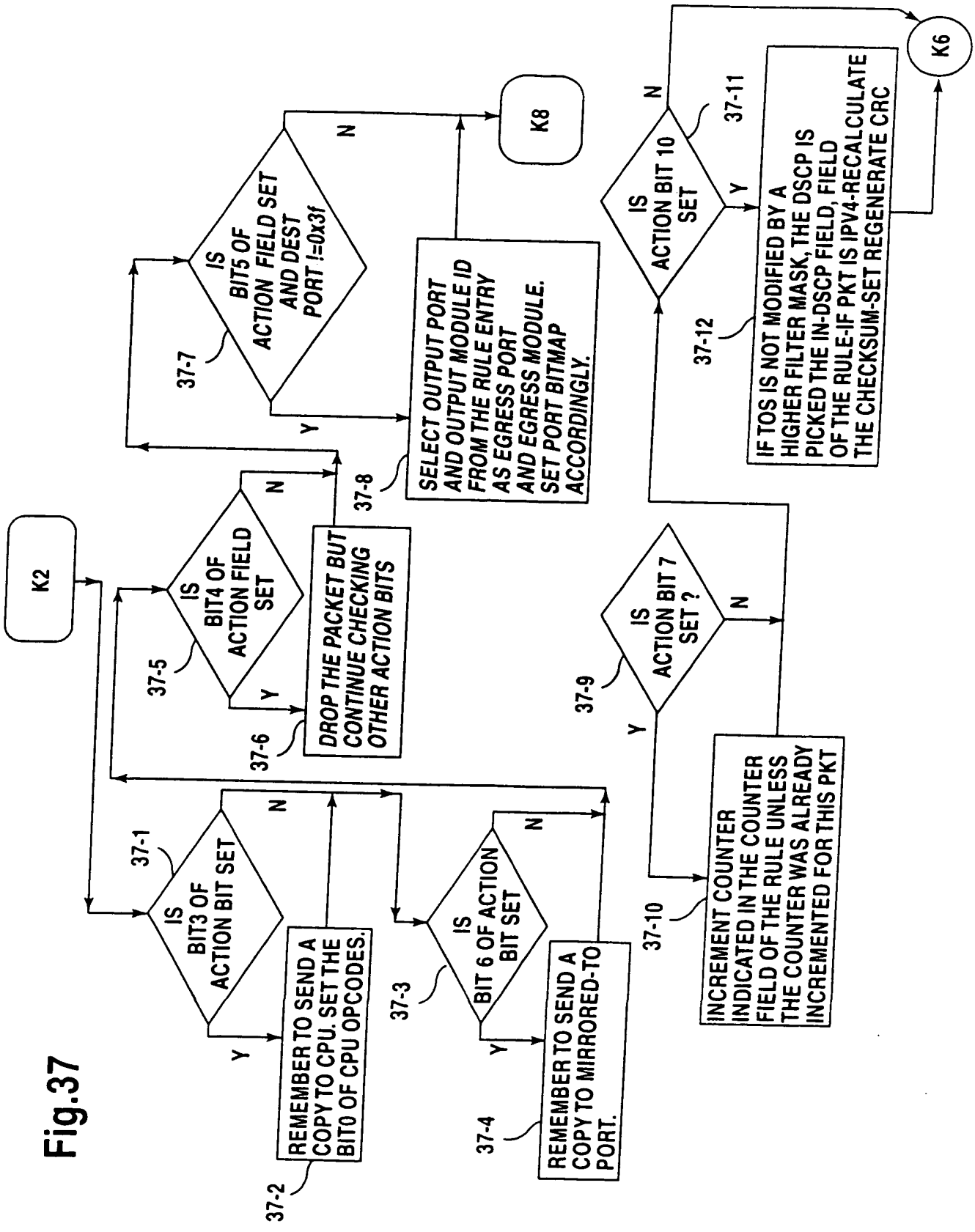

K2
IS BIT3 OF ACTION BIT SET
37-1
Y
N
REMEMBER TO SEND A COPY TO CPU. SET THE BIT0 OF CPU OPCODES.
37-2
IS BIT 6 OF ACTION BIT SET
37-3
Y
N
REMEMBER TO SEND A COPY TO MIRRORED-TO PORT.
37-4
IS BIT4 OF ACTION FIELD SET
37-5
Y
N
DROP THE PACKET BUT CONTINUE CHECKING OTHER ACTION BITS
37-6
IS BIT5 OF ACTION FIELD SET AND DEST PORT !=0x3f
37-7
Y
N
SELECT OUTPUT PORT AND OUTPUT MODULE ID FROM THE RULE ENTRY AS EGRESS PORT AND EGRESS MODULE. SET PORT BITMAP ACCORDINGLY.
37-8
K8
IS ACTION BIT 7 SET ?
37-9
Y
N
INCREMENT COUNTER INDICATED IN THE COUNTER FIELD OF THE RULE UNLESS THE COUNTER WAS ALREADY INCREMENTED FOR THIS PKT
37-10
IS ACTION BIT 10 SET
37-11
Y
N
IF TOS IS NOT MODIFIED BY A HIGHER FILTER MASK, THE DSCP IS PICKED THE IN-DSCP FIELD, FIELD OF THE RULE-IF PKT IS IPV4-RECALCULATE THE CHECKSUM-SET REGENERATE CRC
37-12
K6

Fig.37

Fig.38

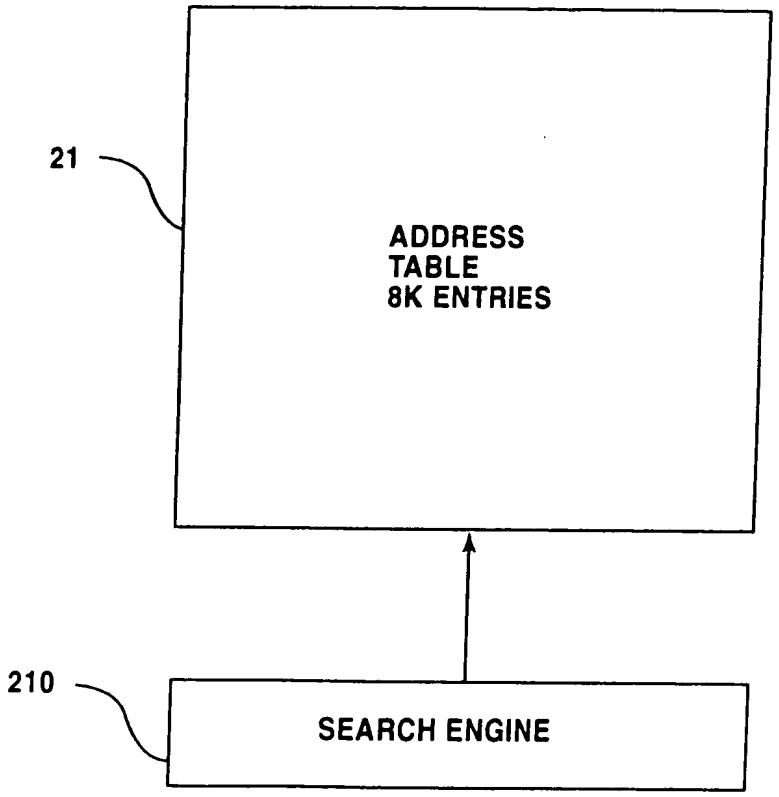


Fig.39

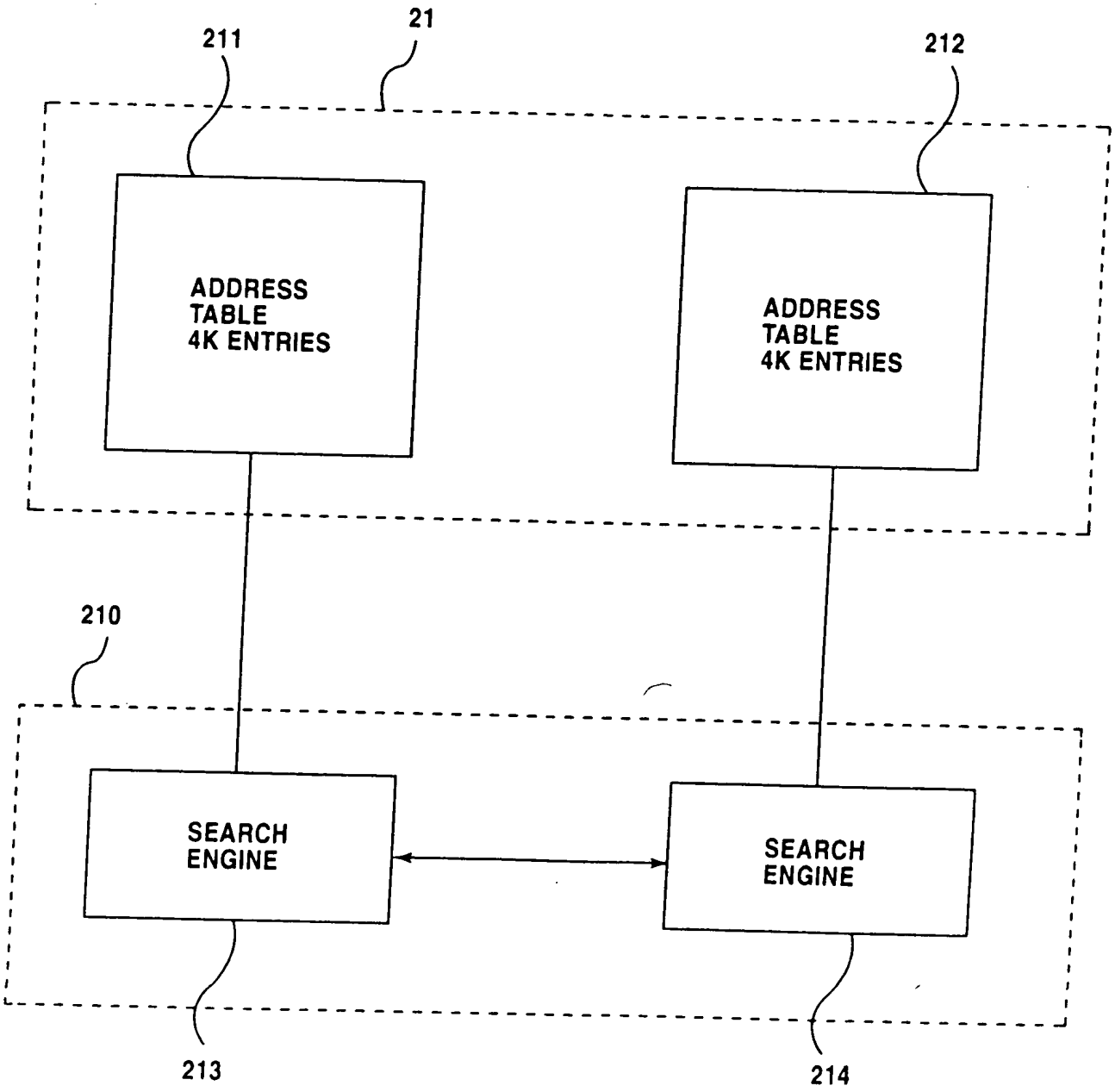

21
211
212
ADDRESS TABLE 4K ENTRIES
ADDRESS TABLE 4K ENTRIES
210
SEARCH ENGINE
SEARCH ENGINE
213
214

Fig.40a

ADDRESS	ENTRY
31	AF
30	AE
29	AD
28	AC
27	AB
26	AA
25	Z
24	Y
23	X
22	W
21	V
20	U
19	T
18	S
17	R
16	Q
15	P
14	O
13	N
12	M
11	L
10	K
9	J
8	I
7	H
6	G
5	F
4	E
3	D
2	C
1	B
0	A

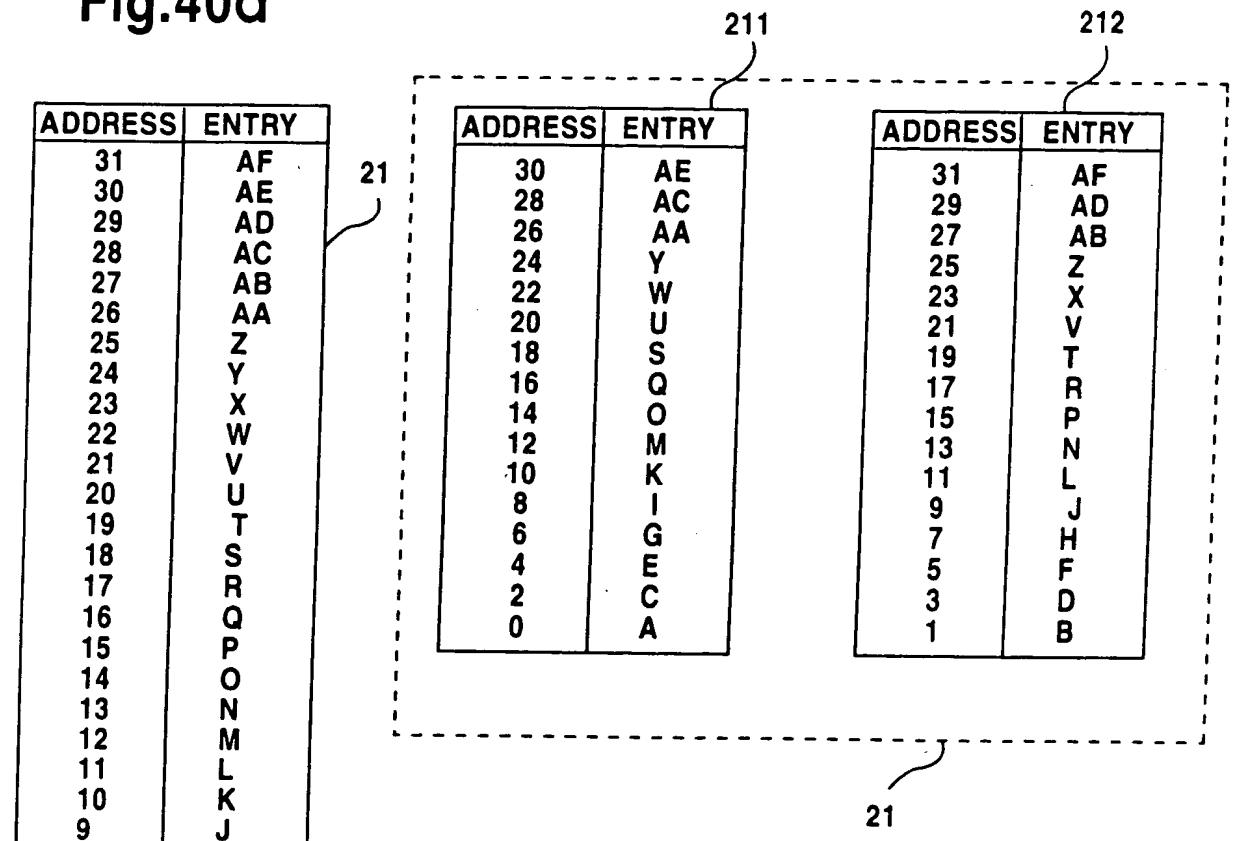


Fig.40b

Fig.41a

ADDRESS	ENTRY
31	NN
30	MM
29	LL
28	KK
27	JJ
26	GH
25	CF
24	CC
23	BE
22	BD
21	BC
20	BA
19	AC
18	AB
17	AA
16	Y
15	X
14	V
13	T
12	S
11	R
10	Q
9	N
8	M
7	L
6	K
5	J
4	G
3	E
2	D
1	C
0	B

21

211

ADDRESS	ENTRY
30	MM
28	KK
26	GH
24	CC
22	BD
20	BA
18	AB
16	Y
14	V
12	S
10	Q
8	M
6	K
4	G
2	D
0	B

212

ADDRESS	ENTRY
31	NN
29	LL
27	JJ
25	CF
23	BE
21	BC
19	AC
17	AA
15	X
13	T
11	R
9	N
7	L
5	J
3	E
1	C

Fig.41b

42.47

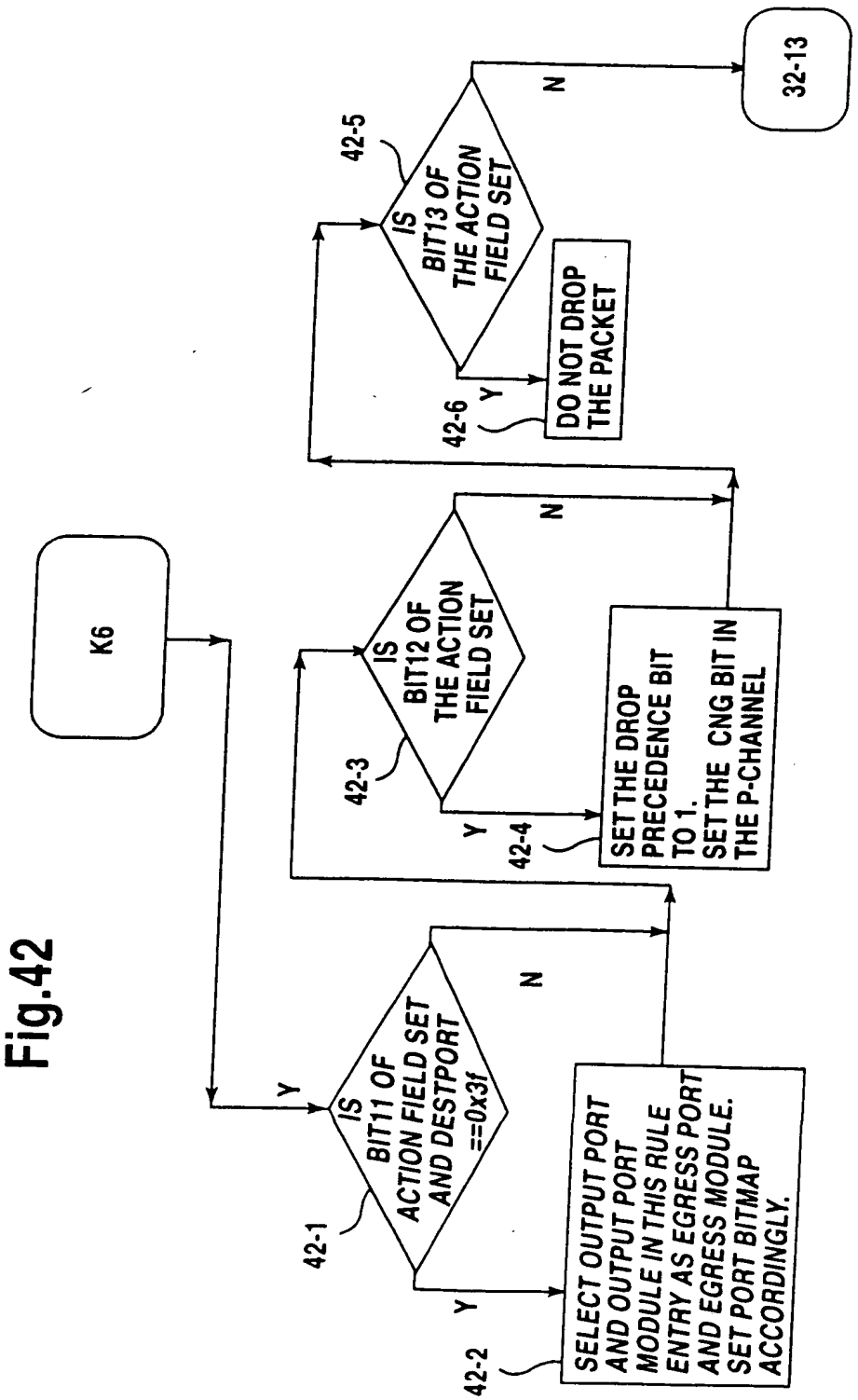

K6
IS BIT11 OF ACTION FIELD SET AND DESTPORT ==0x3f
42-1
Y
N
SELECT OUTPUT PORT AND OUTPUT PORT MODULE IN THIS RULE ENTRY AS EGRESS PORT AND EGRESS MODULE. SET PORT BITMAP ACCORDINGLY.
42-2
IS BIT12 OF THE ACTION FIELD SET
42-3
Y
N
SET THE DROP PRECEDENCE BIT TO 1. SET THE CNG BIT IN THE P-CHANNEL
42-4
IS BIT13 OF THE ACTION FIELD SET
42-5
Y
N
DO NOT DROP THE PACKET
42-6
32-13

Fig.42

Fig.43

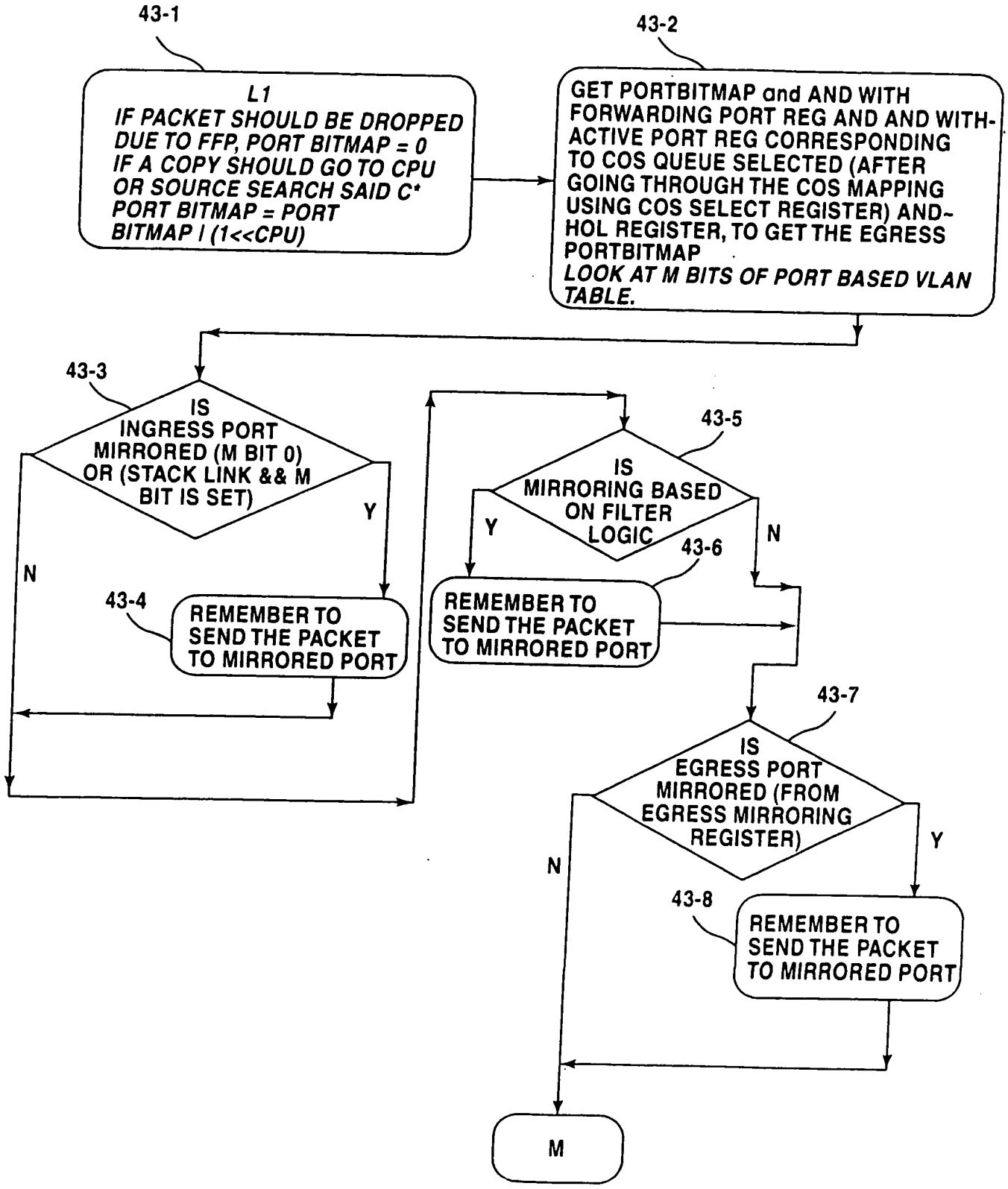

43-1
L1
IF PACKET SHOULD BE DROPPED DUE TO FFP, PORT BITMAP = 0
IF A COPY SHOULD GO TO CPU OR SOURCE SEARCH SAID C* PORT BITMAP = PORT BITMAP | (1<<CPU)
43-2
GET PORTBITMAP and AND WITH FORWARDING PORT REG AND AND WITH-ACTIVE PORT REG CORRESPONDING TO COS QUEUE SELECTED (AFTER GOING THROUGH THE COS MAPPING USING COS SELECT REGISTER) AND-HOL REGISTER, TO GET THE EGRESS PORTBITMAP
LOOK AT M BITS OF PORT BASED VLAN TABLE.
43-3
IS INGRESS PORT MIRRORED (M BIT 0) OR (STACK LINK && M BIT IS SET)
Y
N
43-4
REMEMBER TO SEND THE PACKET TO MIRRORED PORT
43-5
IS MIRRORING BASED ON FILTER LOGIC
Y
N
43-6
REMEMBER TO SEND THE PACKET TO MIRRORED PORT
43-7
IS EGRESS PORT MIRRORED (FROM EGRESS MIRRORING REGISTER)
Y
N
43-8
REMEMBER TO SEND THE PACKET TO MIRRORED PORT
M

Fig.44

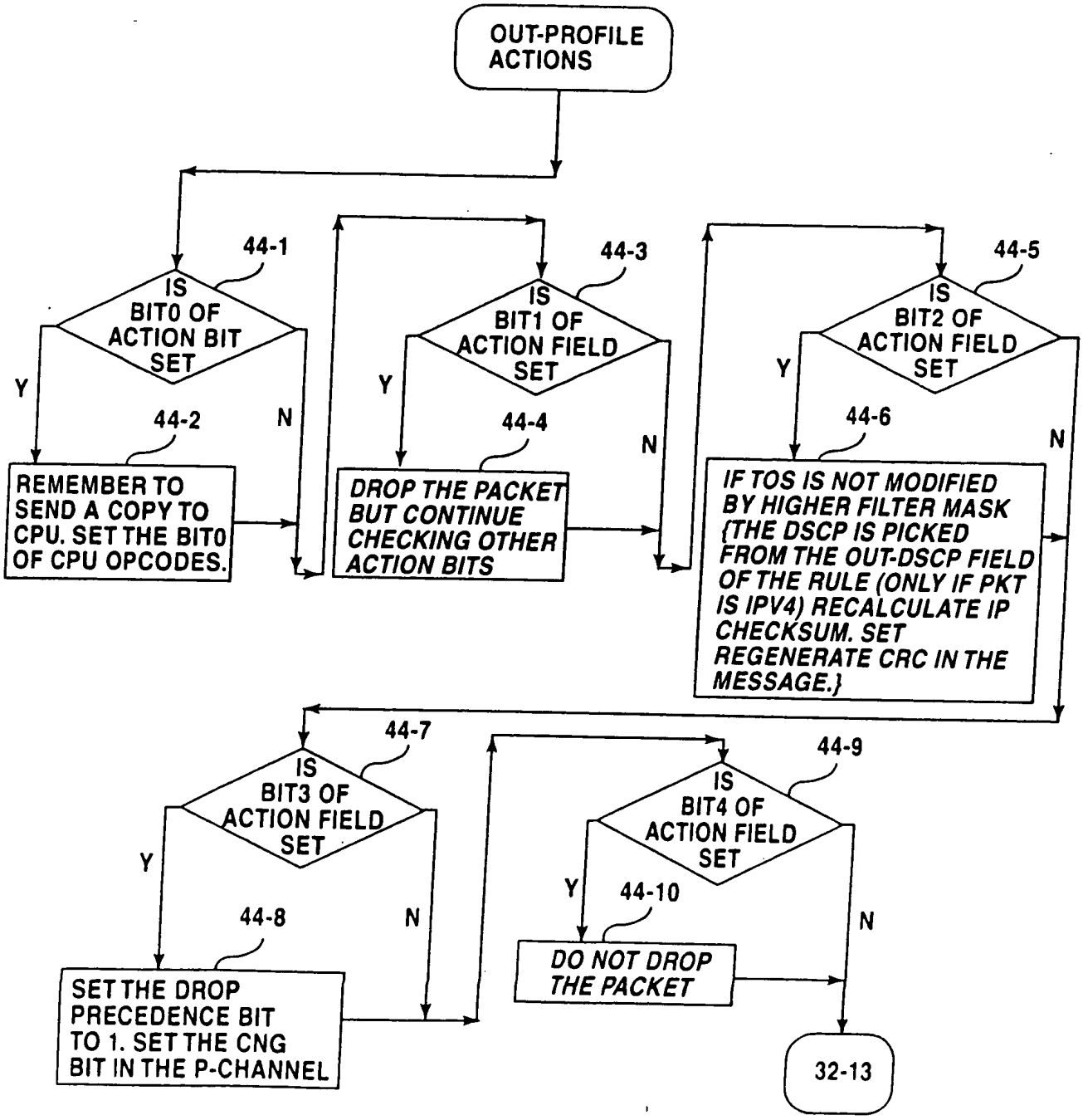

OUT-PROFILE ACTIONS
44-1
IS BIT0 OF ACTION BIT SET
Y
N
44-2
REMEMBER TO SEND A COPY TO CPU. SET THE BIT0 OF CPU OPCODES.
44-3
IS BIT1 OF ACTION FIELD SET
Y
N
44-4
DROP THE PACKET BUT CONTINUE CHECKING OTHER ACTION BITS
44-5
IS BIT2 OF ACTION FIELD SET
Y
N
44-6
IF TOS IS NOT MODIFIED BY HIGHER FILTER MASK {THE DSCP IS PICKED FROM THE OUT-DSCP FIELD OF THE RULE (ONLY IF PKT IS IPV4) RECALCULATE IP CHECKSUM. SET REGENERATE CRC IN THE MESSAGE.}
44-7
IS BIT3 OF ACTION FIELD SET
Y
N
44-8
SET THE DROP PRECEDENCE BIT TO 1. SET THE CNG BIT IN THE P-CHANNEL
44-9
IS BIT4 OF ACTION FIELD SET
Y
N
44-10
DO NOT DROP THE PACKET
32-13

Fig.45

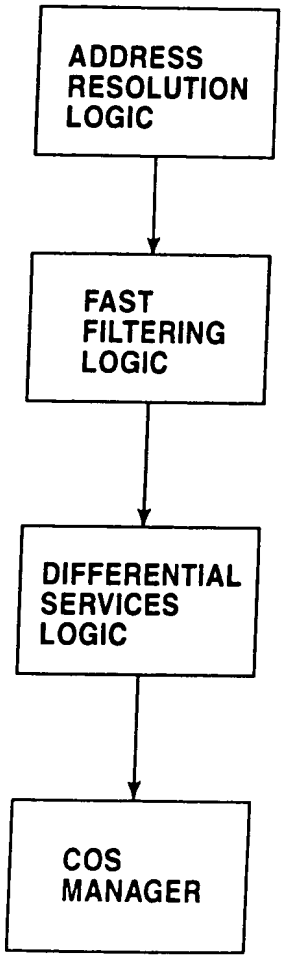
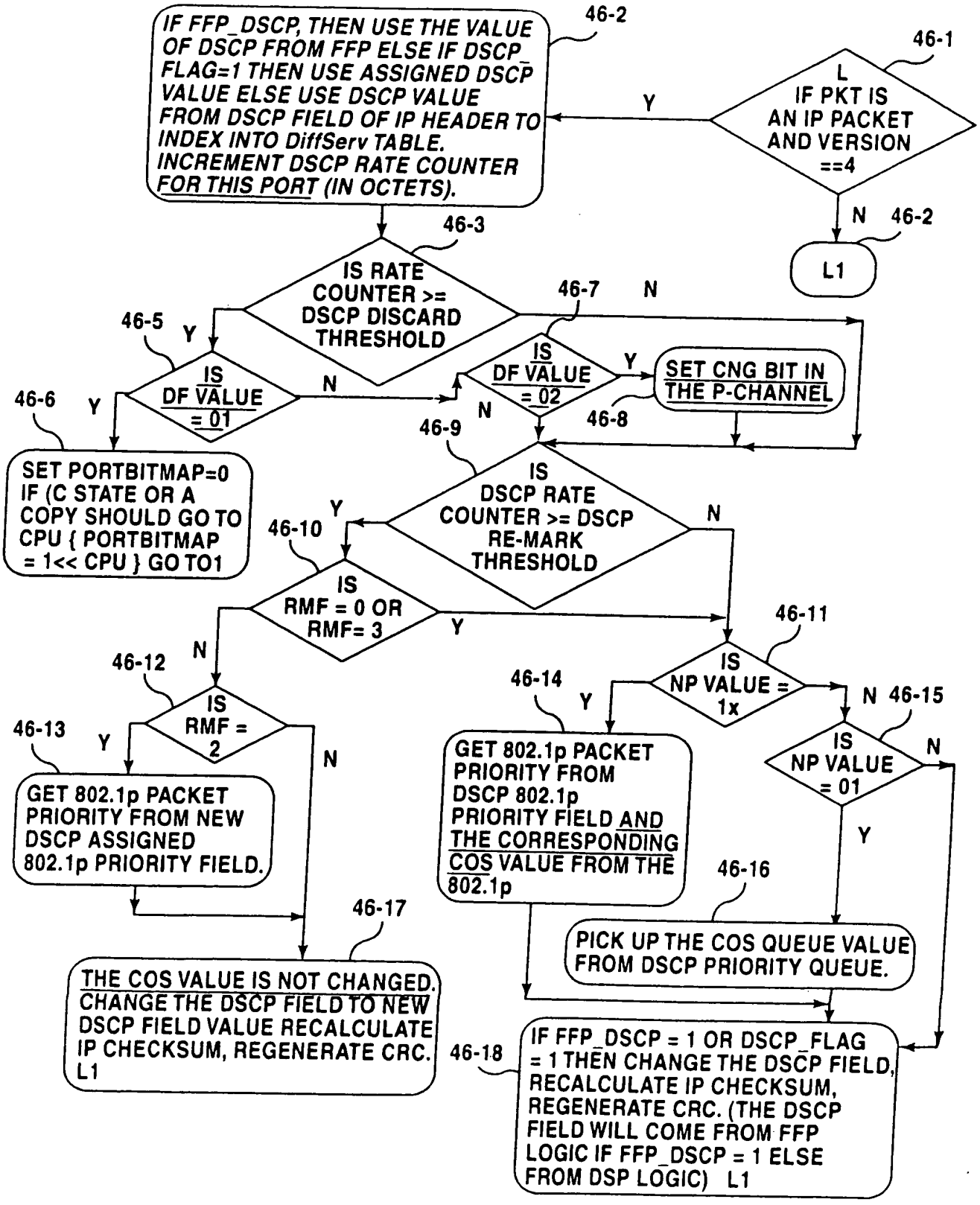

ADDRESS RESOLUTION LOGIC
FAST FILTERING LOGIC
DIFFERENTIAL SERVICES LOGIC
COS MANAGER

Fig.46


46-1
L
IF PKT IS AN IP PACKET AND VERSION ==4
Y
N
46-2
L1
46-2
IF FFP_DSCP, THEN USE THE VALUE OF DSCP FROM FFP ELSE IF DSCP_FLAG=1 THEN USE ASSIGNED DSCP VALUE ELSE USE DSCP VALUE FROM DSCP FIELD OF IP HEADER TO INDEX INTO DiffServ TABLE. INCREMENT DSCP RATE COUNTER FOR THIS PORT (IN OCTETS).
46-3
IS RATE COUNTER >= DSCP DISCARD THRESHOLD
46-5
Y
N
46-7
N
IS DF VALUE = 01
Y
N
IS DF VALUE = 02
Y
N
SET CNG BIT IN THE P-CHANNEL
46-8
46-6
Y
SET PORTBITMAP=0 IF (C STATE OR A COPY SHOULD GO TO CPU { PORTBITMAP = 1<< CPU } GO TO1
46-9
IS DSCP RATE COUNTER >= DSCP RE-MARK THRESHOLD
Y
N
46-10
IS RMF = 0 OR RMF= 3
Y
N
46-11
IS NP VALUE = 1x
Y
N
46-15
IS NP VALUE = 01
Y
N
46-12
IS RMF = 2
46-13
Y
N
GET 802.1p PACKET PRIORITY FROM NEW DSCP ASSIGNED 802.1p PRIORITY FIELD.
46-14
Y
GET 802.1p PACKET PRIORITY FROM DSCP 802.1p PRIORITY FIELD AND THE CORRESPONDING COS VALUE FROM THE 802.1p
46-16
PICK UP THE COS QUEUE VALUE FROM DSCP PRIORITY QUEUE.
46-17
THE COS VALUE IS NOT CHANGED. CHANGE THE DSCP FIELD TO NEW DSCP FIELD VALUE RECALCULATE IP CHECKSUM, REGENERATE CRC. L1
46-18
IF FFP_DSCP = 1 OR DSCP_FLAG = 1 THEN CHANGE THE DSCP FIELD, RECALCULATE IP CHECKSUM, REGENERATE CRC. (THE DSCP FIELD WILL COME FROM FFP LOGIC IF FFP_DSCP = 1 ELSE FROM DSP LOGIC) L1

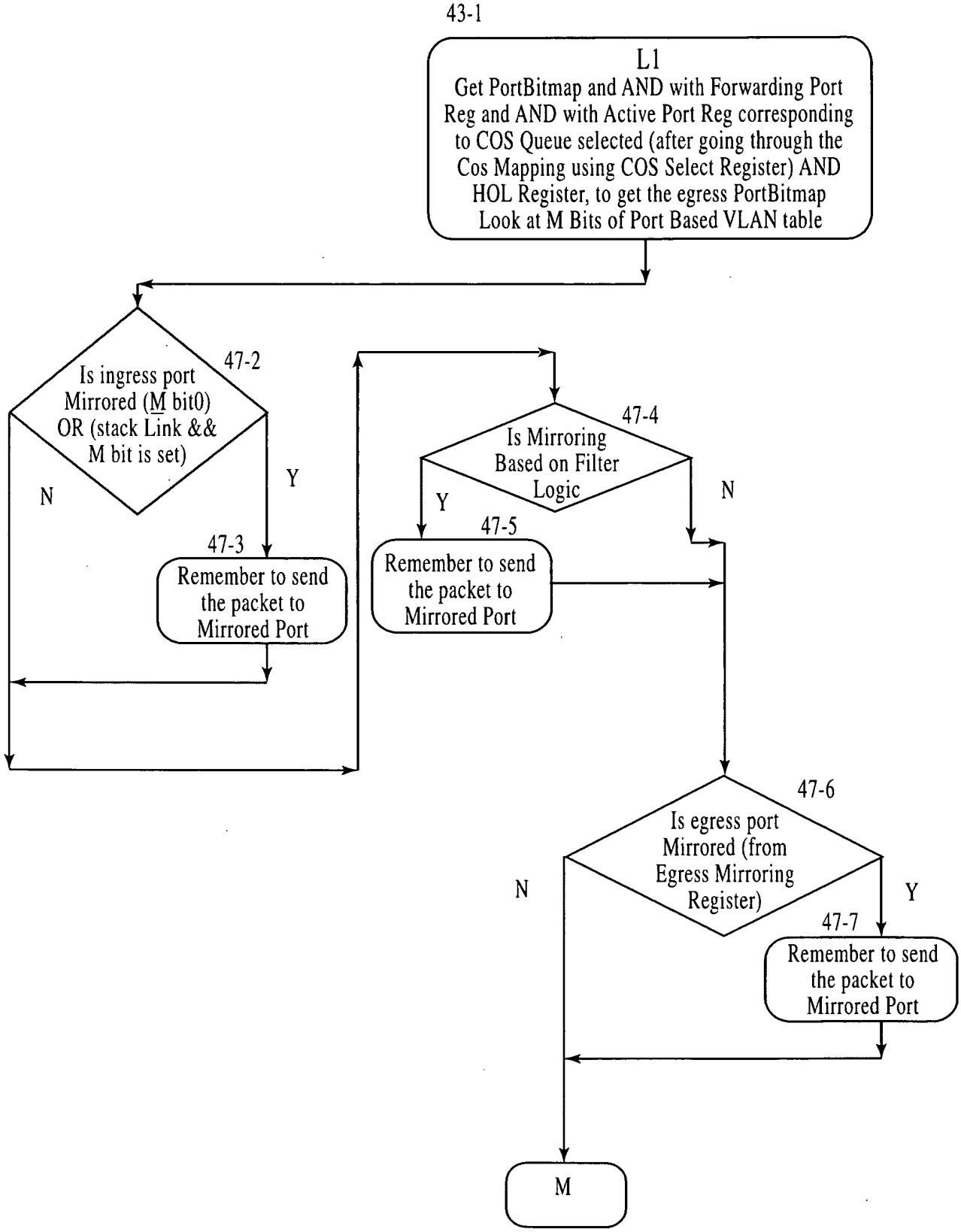

43-1
L1
Get PortBitmap and AND with Forwarding Port Reg and AND with Active Port Reg corresponding to COS Queue selected (after going through the Cos Mapping using COS Select Register) AND HOL Register, to get the egress PortBitmap
Look at M Bits of Port Based VLAN table
47-2
Is ingress port Mirrored (M bit0) OR (stack Link && M bit is set)
N
Y
47-3
Remember to send the packet to Mirrored Port
47-4
Is Mirroring Based on Filter Logic
Y
N
47-5
Remember to send the packet to Mirrored Port
47-6
Is egress port Mirrored (from Egress Mirroring Register)
N
Y
47-7
Remember to send the packet to Mirrored Port
M

Fig.47

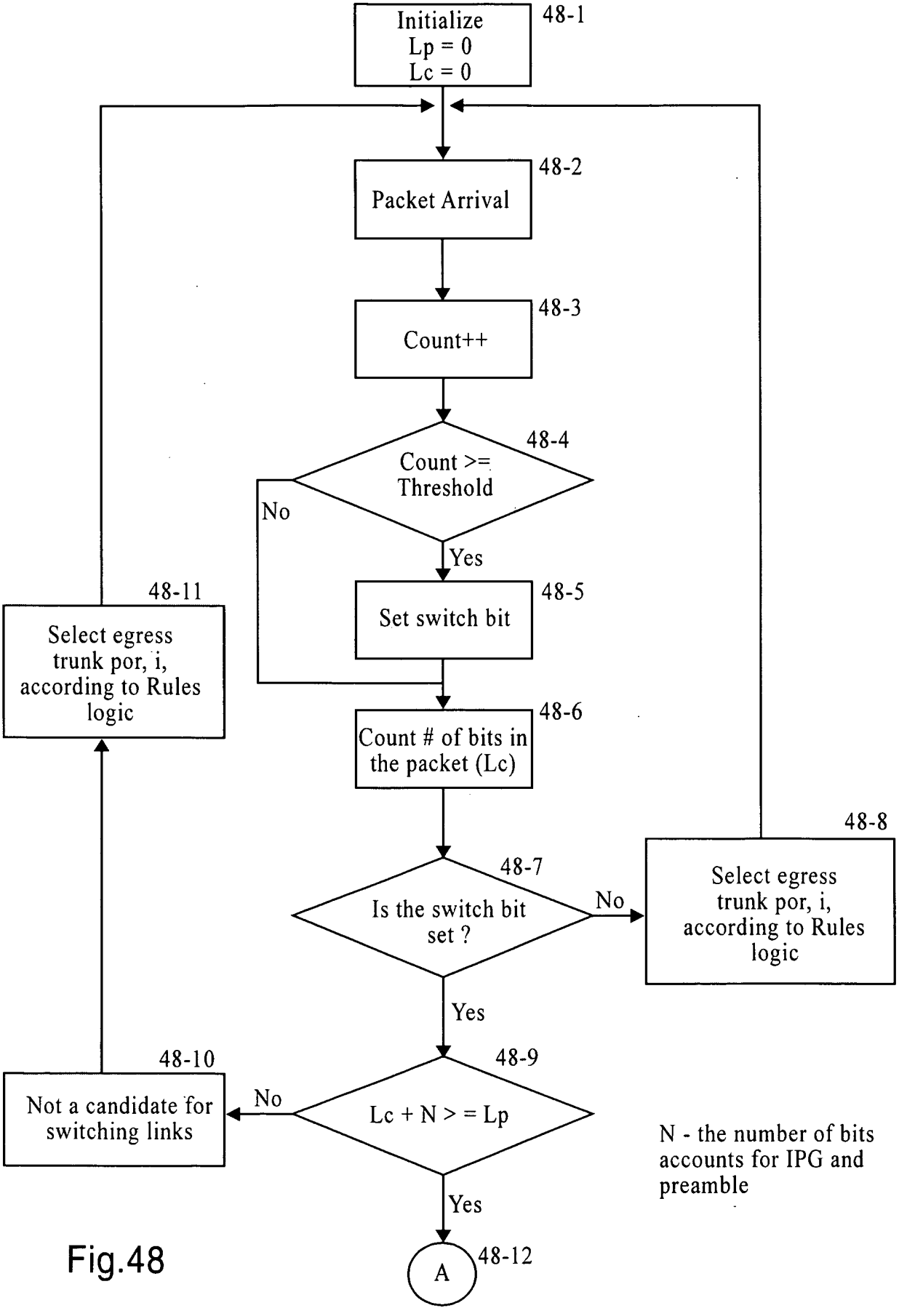

Initialize
Lp = 0
Lc = 0
48-1
Packet Arrival
48-2
Count++
48-3
Count >= Threshold
48-4
No
Yes
Set switch bit
48-5
Count # of bits in the packet (Lc)
48-6
Is the switch bit set ?
48-7
No
Yes
Select egress trunk por, i, according to Rules logic
48-8
Lc + N > = Lp
48-9
No
Yes
Not a candidate for switching links
48-10
Select egress trunk por, i, according to Rules logic
48-11
A
48-12
N - the number of bits accounts for IPG and preamble

Fig.48

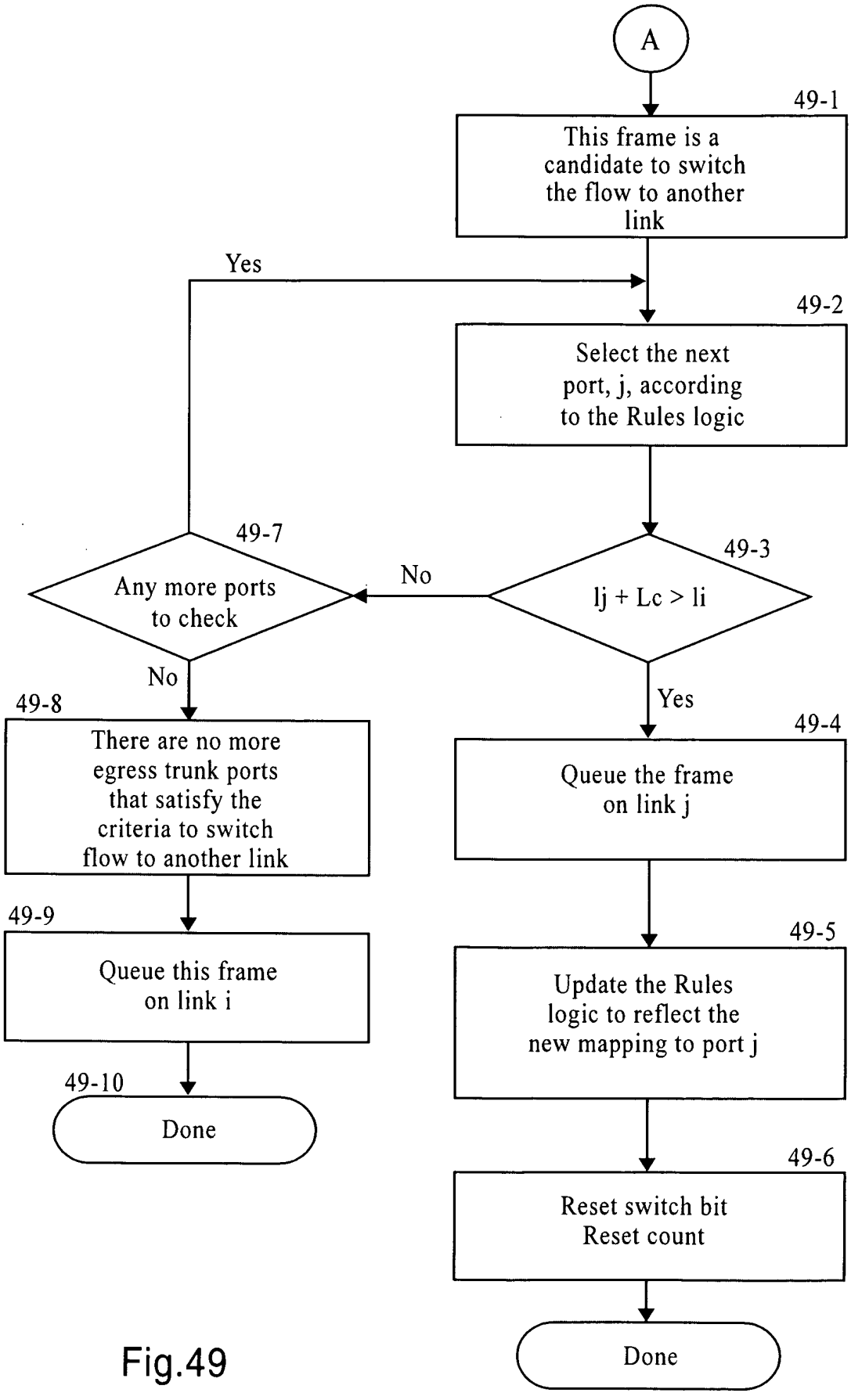

A
49-1
This frame is a candidate to switch the flow to another link
Yes
49-2
Select the next port, j, according to the Rules logic
49-7
Any more ports to check
No
49-3
lj + Lc > li
No
Yes
49-8
There are no more egress trunk ports that satisfy the criteria to switch flow to another link
49-4
Queue the frame on link j
49-9
Queue this frame on link i
49-5
Update the Rules logic to reflect the new mapping to port j
49-10
Done
49-6
Reset switch bit
Reset count
Done

Fig.49

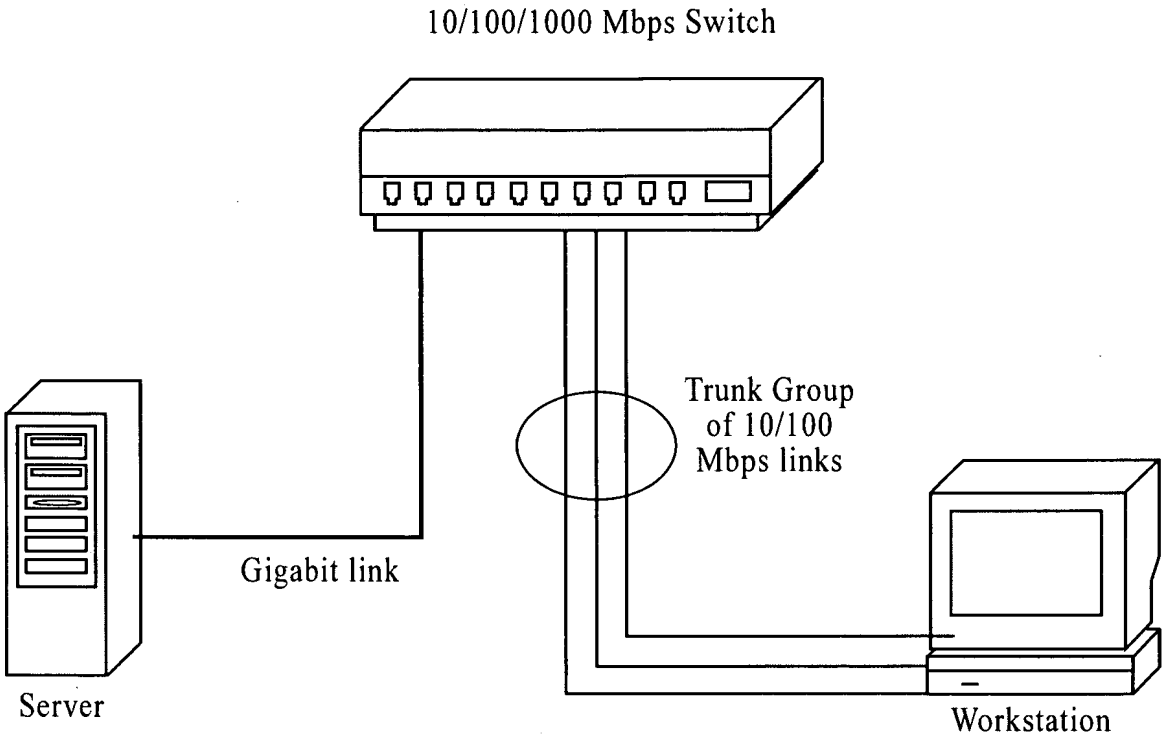

10/100/1000 Mbps Switch
Trunk Group
of 10/100
Mbps links
Gigabit link
Server
Workstation

Fig.50

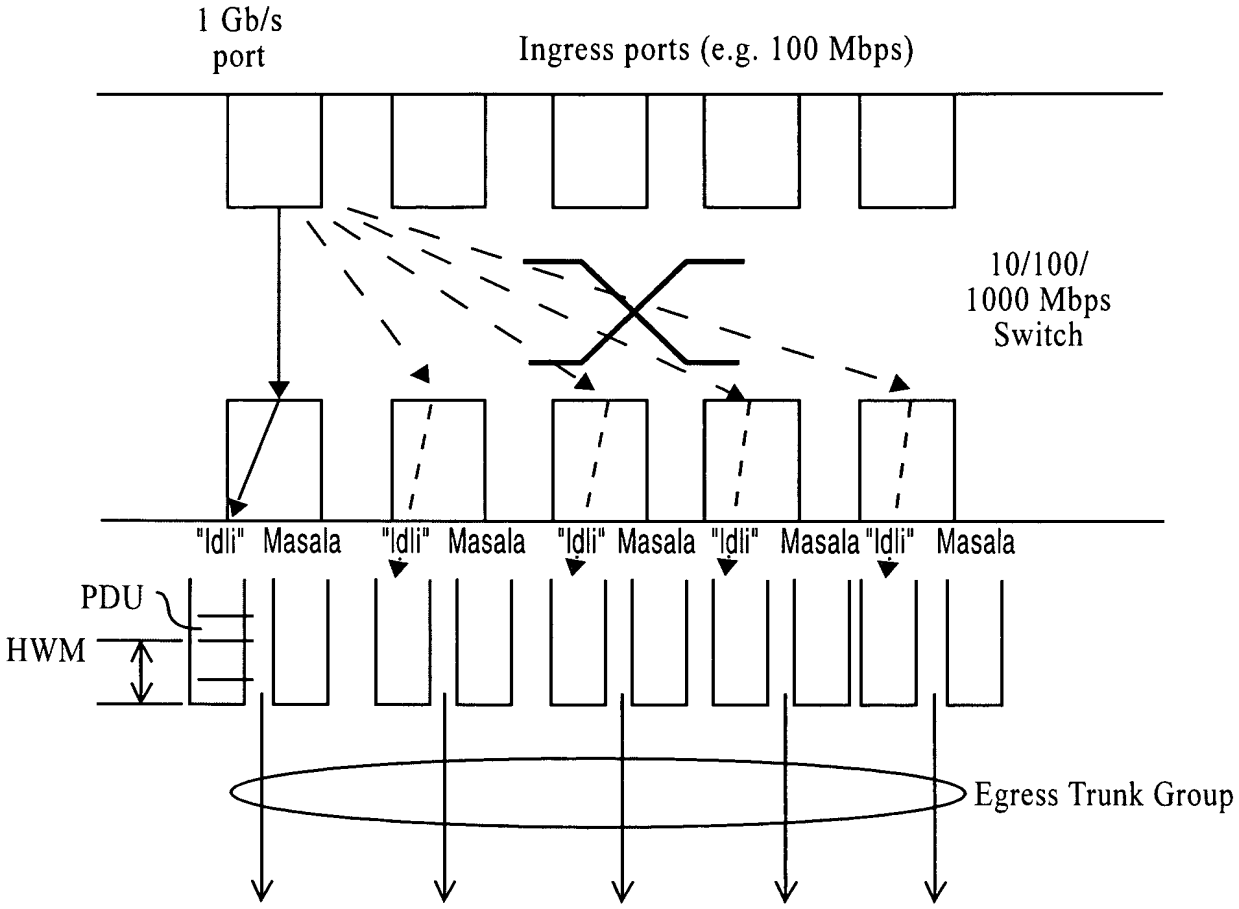

1 Gb/s
port
Ingress ports (e.g. 100 Mbps)
10/100/
1000 Mbps
Switch
"Idli" Masala "Idli" Masala "Idli" Masala "Idli" Masala "Idli" Masala
PDU
HWM
Egress Trunk Group

Fig.51

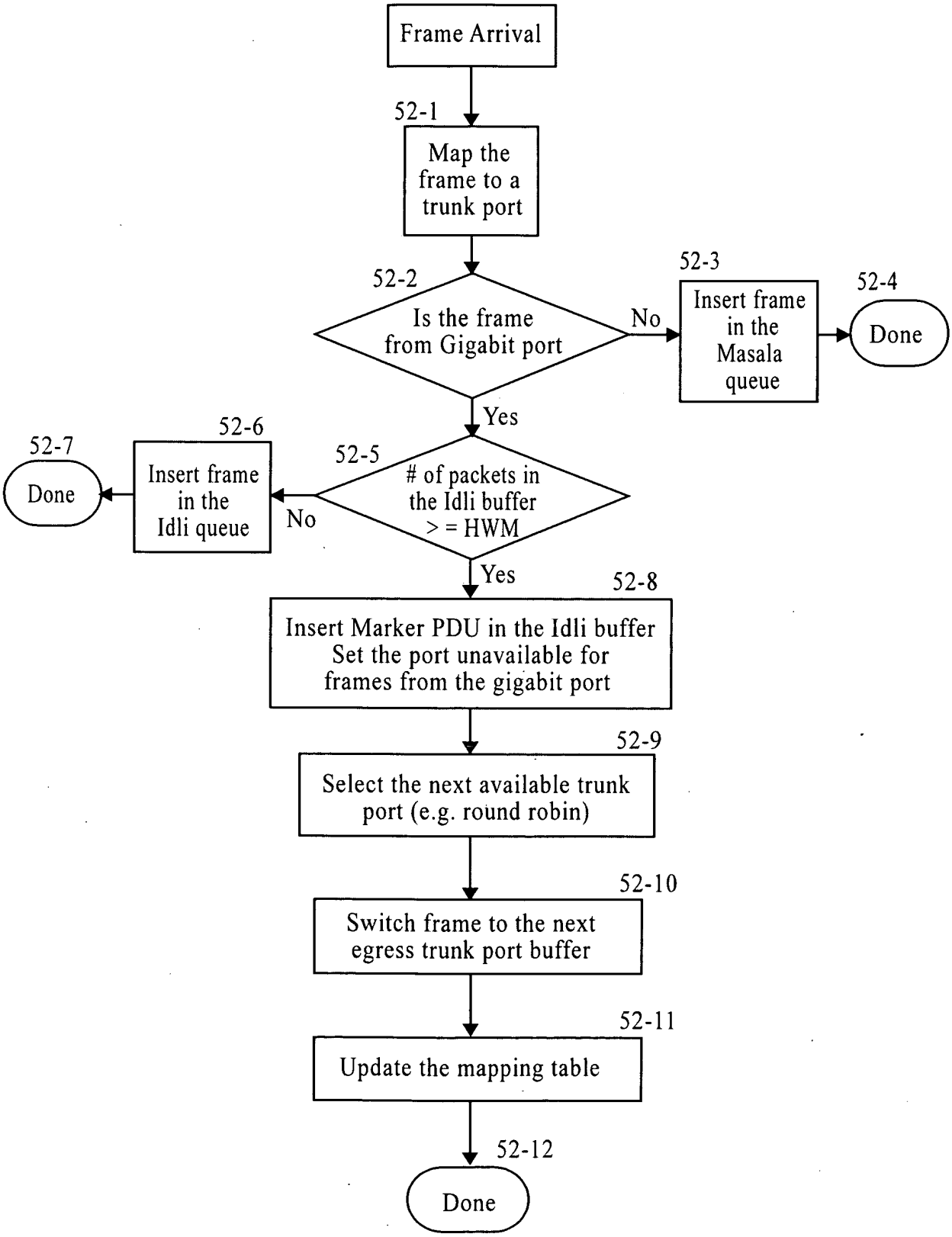

Frame Arrival
52-1
Map the frame to a trunk port
52-2
Is the frame from Gigabit port
No
52-3
Insert frame in the Masala queue
52-4
Done
Yes
52-5
# of packets in the Idli buffer > = HWM
No
52-6
Insert frame in the Idli queue
52-7
Done
Yes
52-8
Insert Marker PDU in the Idli buffer
Set the port unavailable for frames from the gigabit port
52-9
Select the next available trunk port (e.g. round robin)
52-10
Switch frame to the next egress trunk port buffer
52-11
Update the mapping table
52-12
Done

Fig.52

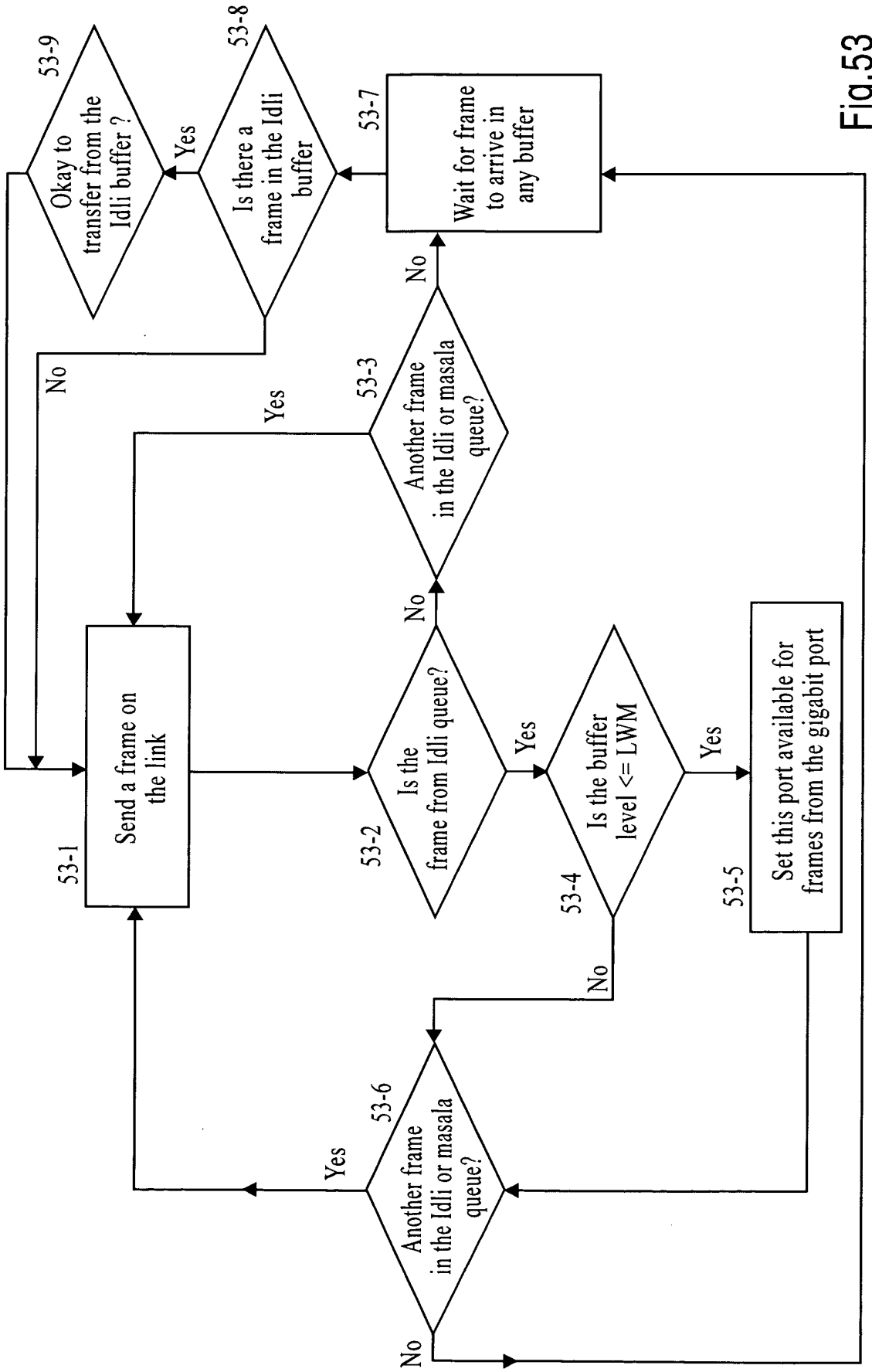

Send a frame on the link
53-1
Is the frame from Idli queue?
53-2
Yes
No
Is the buffer level <= LWM
53-4
Yes
No
Set this port available for frames from the gigabit port
53-5
Another frame in the Idli or masala queue?
53-6
Yes
No
Another frame in the Idli or masala queue?
53-3
Yes
No
Is there a frame in the Idli buffer
53-8
Yes
No
Okay to transfer from the Idli buffer ?
53-9
Wait for frame to arrive in any buffer
53-7

Fig.53

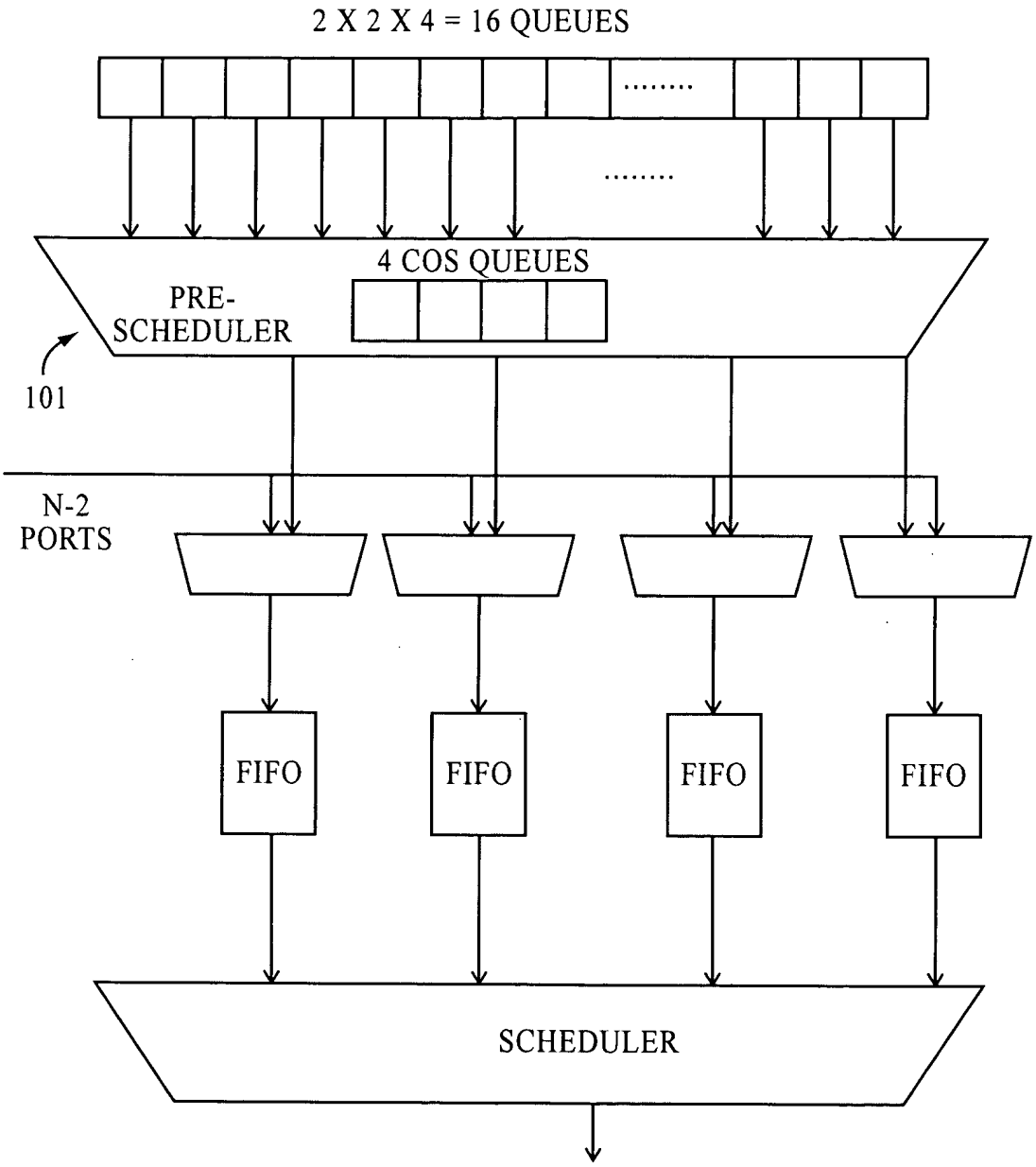

2 X 2 X 4 = 16 QUEUES
4 COS QUEUES
PRE-
SCHEDULER
101
N-2
PORTS
FIFO
FIFO
FIFO
FIFO
SCHEDULER

Fig.54

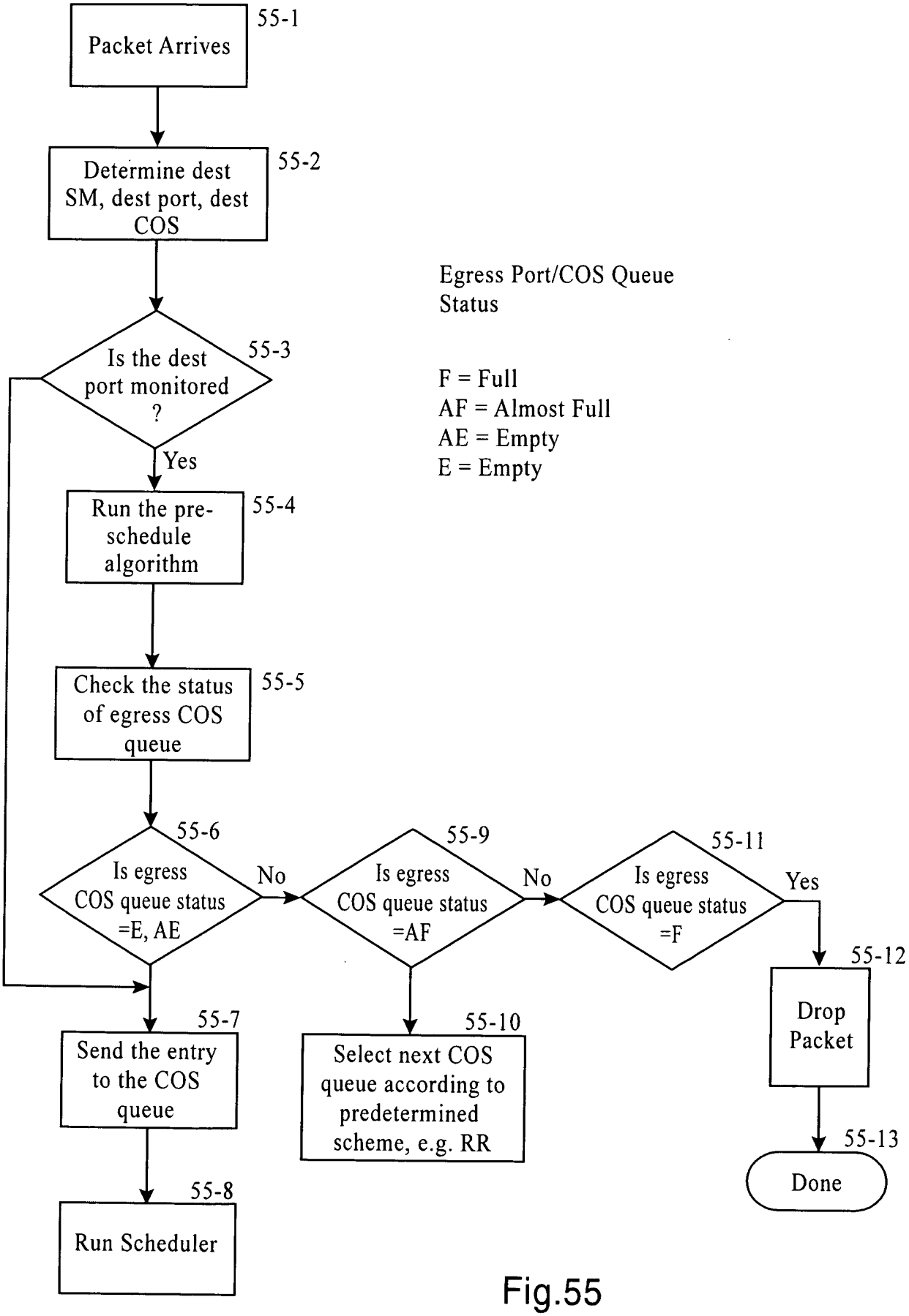

Packet Arrives
55-1
Determine dest SM, dest port, dest COS
55-2
Is the dest port monitored ?
55-3
Yes
Run the pre-schedule algorithm
55-4
Check the status of egress COS queue
55-5
Is egress COS queue status =E, AE
55-6
No
Is egress COS queue status =AF
55-9
No
Is egress COS queue status =F
55-11
Yes
Send the entry to the COS queue
55-7
Select next COS queue according to predetermined scheme, e.g. RR
55-10
Drop Packet
55-12
Run Scheduler
55-8
Done
55-13
Egress Port/COS Queue Status
F = Full
AF = Almost Full
AE = Empty
E = Empty

Fig.55

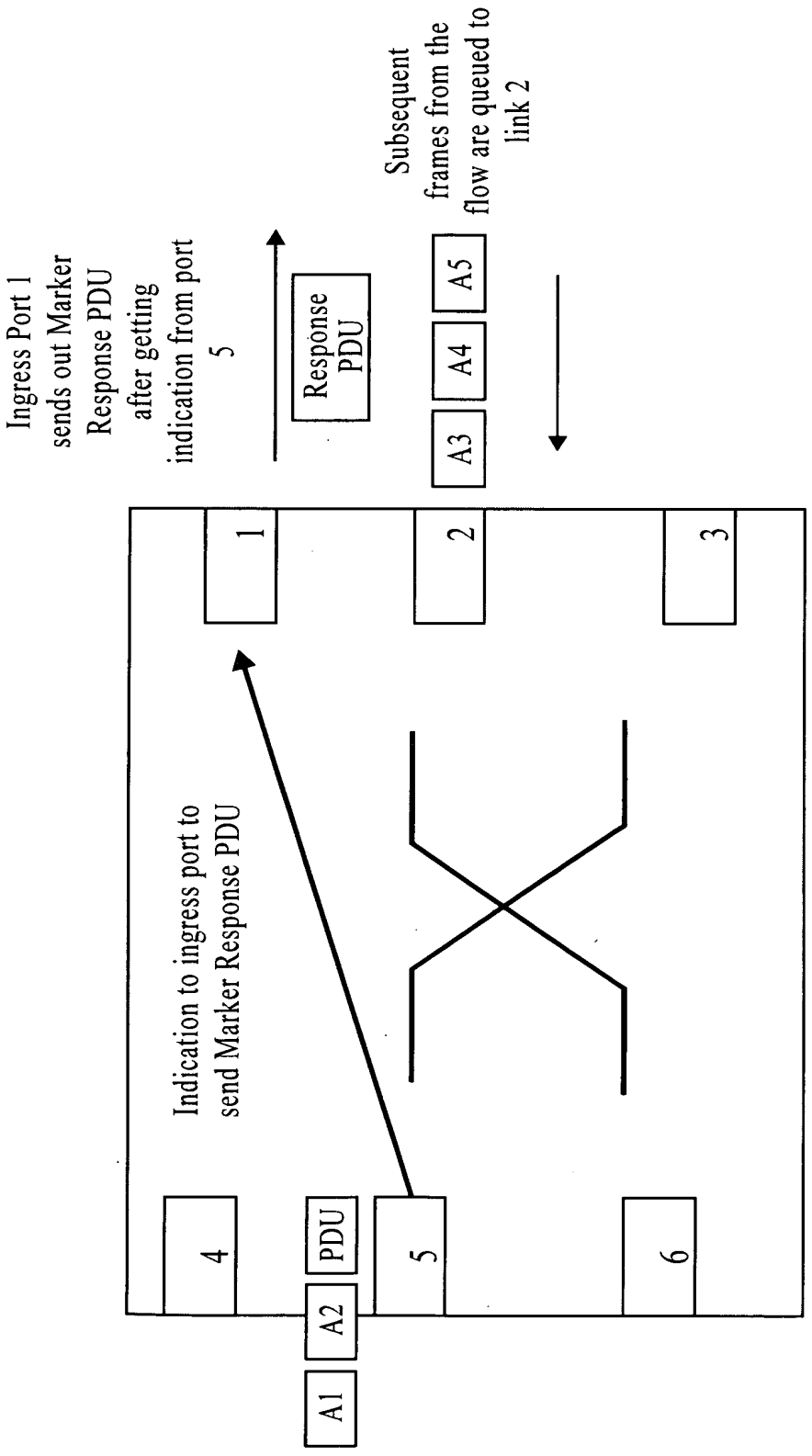

Ingress Port 1 sends out Marker Response PDU after getting indication from port 5
Response PDU
Subsequent frames from the flow are queued to link 2
A3
A4
A5
Indication to ingress port to send Marker Response PDU
1
2
3
4
5
6
PDU
A1
A2

Fig.56